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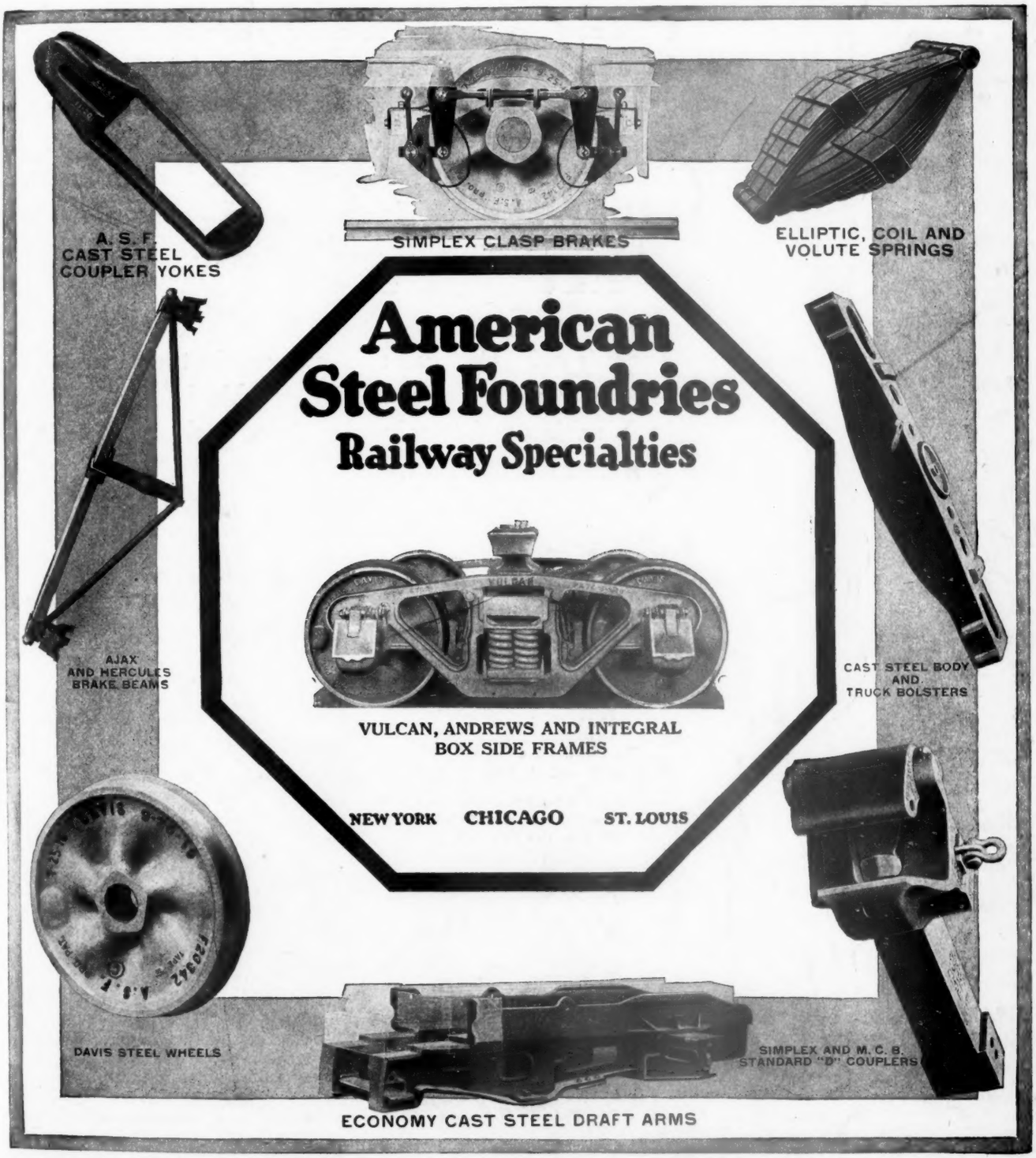
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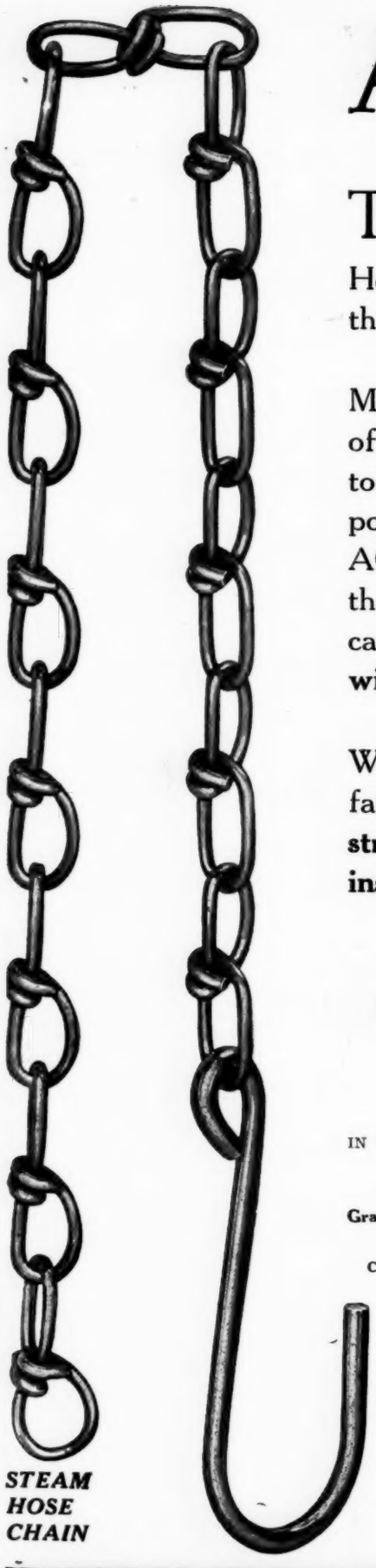

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EDITORIAL

Railway Age

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Signs of Improving Conditions

Many signs indicate that the turn has come in business, and that it may reasonably be hoped that from now on it will more or less steadily and substantially improve. The money market is easier, and the prices of securities somewhat higher than for some time. Of significance, unquestionably, are the changes which are occurring in the railroad freight situation. Recently, for the first time in months, the car surplus has shown a small decline. The number of cars of freight loaded, including even coal cars, has been showing increases, and in the week ended April 16 total car loadings of all kinds of freight were 738,906, the largest figure reported since the week ended January 15. Probably it is too early to begin to express much optimism, but certainly there are many indications that the worst of the depression has been experienced and passed.

Are We Really Getting Anywhere?

It is now over ten years since the disastrous derailment on the Lehigh Valley at Manchester, N. Y., brought the transverse fissure before railway men as a new and particularly dangerous form of rail failure. Since that time thousands of similar failures have occurred in all parts of the country, in rails from different mills and under varying densities of traffic. Because of its particularly dangerous character the transverse fissure has received a great deal of attention from metallurgists and engineers, both individually and collectively. Their investigations have developed certain information of value, such as the fact that all rails of a heat commonly show the same characteristics in this respect. The reason for this tendency and the conditions which give rise to these fissures are, however, as yet unknown. Various theories have been projected from time to time but none has yet been proven. This form of failure is so dangerous and it is increasing so rapidly in frequency that no stone should be left unturned to arrive at the determination of its cause and the formulation of means for its elimination.

Better Supervision to Prevent Loss and Damage

While much of it is due to improper packing, the causes of the greater part of loss and damage, aside from theft, are improper handling and improper loading. This is well understood and on many of the more progressive roads, numerous plans and "drives" have been inaugurated to help remedy the situation. In general, such plans as have proved to be of value have been based on the principle of securing better supervision of loading. One road, as an experiment, assigned the loading of three cars daily to each of its agents at one of its terminals. These three cars were "charged" to each agent and he was required personally to oversee their loading. Notes were kept of the contents, the manner in which they were stowed, the name of the man in charge, etc. The car numbers were then sent to the agent at destination or, if bulk was to be broken en route, to the designated point. On arrival an inspection was made of each car. Where any irregularities were noted, a complete record was made of the condition of the load and the loading as observed on arrival and copies sent to the loss and damage department. Through this the agents were checked up and interested in securing better loading and causing less loss and damage claims since, with complete data at hand as to the loading at the point of origin and condition of shipments at destination, it was possible to get at some of the underlying causes.

The Consolidation of Operating Divisions

One of the effects of the present acute necessity for retrenchment in expenses is the tendency to consolidate operating divisions with the consequent enlargement of territory under the supervision of a division staff. Within the past three or four weeks several roads, particularly in the west, have eliminated one or more division organizations. The most drastic change of this character which has been announced is that on the Chicago, Rock Island & Pacific where six divisions have been eliminated, as announced in our news columns this week. This tendency emphasizes the contrast in the practices of different railroads regarding the mileage which they assign to various divisions. Thus the average length of division on the Chicago, Burlington & Quincy, the Atchison, Topeka & Santa Fe and the Chicago, Rock Island & Pacific prior to the recent consolidations was about 425 miles, while the corresponding figure on the Union Pacific and the Southern Pacific was approximately 725 miles. While it is frequently stated with a great deal of truth that the railways as a whole suffer from deficient rather than excessive supervision, this contrast in operating organizations offers food for thought. The cost of a division organization is not confined to the salaries of the officers thereon but is incurred in large measure for the necessary office organization and increased correspondence resulting therefrom. It is possible that the stress for reductions in expenses now confronting the railways may cause other systems to study their organizations and perhaps find possibilities of consolidating divisions here and there. At the same time, with conditions such as they are now, the need for intensive supervision is so great that steps of this kind should not be taken except after most careful consideration.

An Opportunity Recognized

Almost every railroad which serves great industrial centers finds itself at some time or another in need of extending its facilities to take care of increasing traffic. Practically every road in such a position finds the high cost of additional lands an important limiting factor in any program for extensive improvements. The size and importance of the industrial concerns in the vicinity have increased land values and all available space close to the railroad is highly developed so that additional property can be obtained by the road only at almost prohibitive prices. The railways of the devastated regions of France and Belgium at the close of the war found themselves in a particularly favorable situation as regards this problem. Many important industrial cities were practically destroyed by the enemy. Because of this the railways were able to secure additional lands at comparatively low prices not only to meet their present requirements but to take

care of their needs for a number of years to come. In addition, many improvements contemplated for years before the war have been embodied in the program for the reconstruction of the old railways. This phase of the railway reconstruction program, together with detailed examples of the extensive improvements provided for at several places, is discussed by Oliver F. Allen in an article appearing elsewhere in this issue. It would appear that this phase of the reconstruction program gives evidence of the same foresight and ability on the part of those in charge as did the solution of the many difficult problems of the early phases of reconstruction when the necessity for the greatest speed in opening the railways to traffic and the shortage of labor and many essential materials combined to challenge engineering skill of a high order.

Placing Machines Scientifically

Closely allied with the question of scheduling work in locomotive repair shops is the need for carefully placing machine tools so that repair parts may be handled with the least possible lost motion. It is self-evident that the greatest economy lies in so arranging machines that a locomotive part will be moved from one to the other until all machine operations are completed without back travel. In this way there is big saving in time and the labor of trucking and long crane hauls are reduced to a minimum. Mechanical department officers as a rule fully appreciate the need for scientifically locating machine tools and many who have been unable to do so before will take the present opportunity to rearrange tools and shop equipment along the lines indicated. Considerable savings can be effected by localizing detailed repair work in sub-departments. This enables machines required for the repair of a given part, as for example a driving box, to be arranged in the order in which machine operations occur and all located in a comparatively small area. In this connection, it is worth while to emphasize the importance of properly locating lye vats for removing dirt and grease from locomotive parts. This is perhaps one of the most common causes of lost time and effort in railroad shops. Many shops try to centralize cleaning operations at one central lye-house and the result is that material repaired at sub-departments must be trucked back and forth a long distance. While large central vats are needed for certain heavy work, the answer to the problem seems to be in the installation of smaller individual tanks in the separate departments. Taken all together, the careful location of railway shop equipment to provide minimum trucking and no back movement offers possibilities of labor saving which are decidedly important.

"Inadequacies of Railway Management"

THE RAILWAYS have presented to the Railroad Labor Board a large amount of evidence showing that the cost of operation is being made excessive and burdensome to them and the public by a grossly inflated payroll. They have tried to prove that rules and working conditions inherited from government control cause inefficiency of labor and make it necessary to employ too many men. They have also tried to prove that the existing wage scales are too high in proportion to the present cost of living and the wages now being paid in other industries, and make necessary passenger and freight rates that are higher than the public ought to be required to pay.

The spokesmen of the labor organizations have made hardly any serious effort to defend the existing rules, working conditions and wages by evidence and arguments tending to show their reasonableness. Almost the sole answer they have made is that large amounts of money are being wasted by the railway managements themselves through financial manipulation, and by failure to effect operating economies which, it is claimed, are perfectly feasible. They contend that no economies should be effected at the immediate cost of labor until every other form of alleged inefficiency and waste has been eliminated. They have introduced before the Labor Board several large printed documents in which they have set forth at length the "evidence" in support of their charges of bad management. The chief author of these exhibits is W. Jett Lauck, who styles himself "consulting economist" of the labor brotherhoods. The most pretentious of them is entitled "Inadequacies of Railway Management."

Upon the theory of the labor leaders themselves, these documents are not pertinent to any question before the board. The labor leaders contend that the railways should be required to establish reasonable rules and working conditions, and reasonable wages, regardless of the financial ability of the companies to meet the resulting payroll. If the inability of the railways to meet the payroll should not be considered in fixing working conditions and wages, then the reason why the railways are unable to meet the payroll, whether it be mismanagement or rates that are too low, has no bearing on the question of working conditions or of wages.

Why, then, do the spokesmen of the labor unions persist in introducing documents designed to show that the railways are being mismanaged? They do it for two obvious purposes. They cry "Stop thief!" to divert attention from the evidence regarding the excessive payroll. They do it, also, as a part of their propaganda to destroy public confidence in private management and further their movement for the Plumb plan. Mr. Lauck and other spokesmen of the unions hyprocritically denounce the comparatively small expenditures the railways are making to present the facts about the railroad situation to the public and at the same time spend many thousands of dollars in the dissemination of libels upon railway management which, if unanswered, would poison public opinion.

Mr. Lauck's document on "Inadequacies of Railway Management" is a classic example of the misrepresentations the labor unions are spending many thousands of dollars in compiling and disseminating. It consists almost entirely of quotations from editorials and articles in the *Railway Age* and the *Railway Mechanical Engineer*, and from addresses made by railway officers. How could he get from such sources evidence that the railways are grossly mismanaged? Very easily. The papers mentioned and railway officers have been engaged for many years in describing at length and in detail the great achievements of the managements in devising and carrying out improvements in plant and in operating methods which have made the railways of this country the leaders of the world in efficiency and economy. They have never claimed, however, that the management of our railways is 100 per cent efficient. They know that, like other human things, it is far from perfect, and they have recognized the fact that it is the function and duty of railway papers and railway officers constantly to point out the respects in which railway plant and operating methods are still imperfect, and to advocate the improvements needed still further to increase efficiency and economy. Among other things, railway papers and railway officers recently have emphasized the fact that the things most needed to increase efficiency and economy are measures which will correct the conditions which are causing the railroad payroll to be excessive.

Mr. Lauck, with commendable diligence, has searched through the files of the *Railway Age* and the *Railway Mechanical Engineer* for months for everything that these papers or railway officers have said regarding efficiency and economy. He has ignored everything he found tending to show that most railroads have been as progressive in making improvements in plant and methods as conditions would permit, and regarding the great gains in efficiency and economy that have been thus obtained. He has ignored all that has been

said about the extent to which the railways have been prevented from making other needed improvements by their inability, due to inadequate net earnings, to raise sufficient new capital. He has ignored all that has been said about the effects of the inefficiency of labor and the excessive wages.

On the other hand, he has pounced upon every article, editorial and statement which has been published pointing out shortcomings of plant and methods of operation. All articles, editorials and statements of this kind he has assembled and published in such a manner as to give the impression that they are the only things that have been said upon the subject of efficiency and economy. When articles, editorials and statements from which he has quoted have pointed out that improvements which they advocated could not be made unless the railways were enabled to earn larger net returns, he has found it convenient to suppress these parts of them.

Having ignored all evidence militating against his preconceived theory of railroad management, and seized upon every fact or statement which apparently tended to support it, Mr. Lauck of course concludes, as he intended from the start, that the railways are grossly mismanaged. He then places the annual cost of this mismanagement at the good round figure of $1,000,000,000. In his exhibit he gives details for only $578,500,000, but he issued a statement to the press placing the entire waste at $1,000,000,000. As for any basis of actual fact his estimate had, he could just as well have made it $1,500,000,000 or $2,000,000,000 a year.

In the discussion of Mr. Lauck's views and estimates regarding railroad efficiency and economy the *Railway Age* does not have to set itself up as an authority, or to prove that it is frank and fair.

Mr. Lauck has tacitly admitted these things. For him to refuse now to accept our views as authoritative would be to destroy the force and effect he has tried to give to all the pages of quotations he has made from our columns. He has bound himself to admit that we are frank and fair in the discussion of problems of railroad efficiency and economy, for he has himself proved our fairness and frankness by quoting so much material from our columns in alleged support of his own views.

Premising our remarks, therefore, on his recognition of the fact that this paper is authoritative, frank and fair, we brand the documents regarding railroad efficiency and economy he has presented to the Railroad Labor Board as among the most wilfully dishonest and misleading productions ever submitted to a government body or to the American public. The man who will deliberately take perhaps one-fifth of the facts presented by any publication or man, upon a given subject, ignore the other four-fifths of the statements made and the facts presented by that publication or man upon the same subject, and then use the one-fifth to prove "mismanagement" which he must know the other four-fifths disprove, is not an "economist," however much he may advertise himself as such. He is merely the cheap, soap-box type of propagandist, who is reckless in what he says either because he does not know what he is talking about or because he does not expect to experience any of the effects of any harm he may do.

The managements of the railways are engaged in great efforts to restore efficiency and economy of operation. Thus far the leaders of the labor unions, who employ Mr. Lauck, have done all they could to defeat these efforts. The fact that they employ Mr. Lauck to spread propaganda, such as his thesis on "Inadequacies of Railway Management," indicates that in efforts to restore efficiency and economy the railway managements cannot hope for any more help from Mr. Lauck's employers than they have received in the past. Fortunately, hundreds of thousands of railway employees and a large part of the public cannot be misled by this low kind of propaganda.

Mr. Lauck's "Estimated Possible Savings"

W. JETT LAUCK, "consulting economist" of certain railway labor unions, has introduced before the Railroad Labor Board elaborate exhibits designed to show that mismanagement of the railways is causing wastes aggregating at least $1,000,000,000 a year. He and other spokesmen of the labor unions contend that no changes in working conditions or wages which will reduce the compensation of labor should be made until all these alleged wastes due to mismanagement have been eliminated. Mr. Lauck also has denounced as unnecessary the course of the railways in laying off many thousands of employees within recent months. It follows, on his theory, that there should not have been any reduction of the payroll below what it was when a large business was being handled last year.

The payroll at that time was running at the rate of about $4,000,000,000 a year. Total operating expenses were running at the rate of about $6,300,000,000 a year. The difference of $2,300,000,000 a year consisted almost entirely of expenditures for fuel, materials and supplies, and loss and damage.

It seems logically to follow, on Mr. Lauck's theory, that the railways should reduce these items an average of 45 per cent before curtailing the payroll in the slightest degree. The total cost of fuel, materials and supplies depends on their prices and the amount of them used. The railways cannot control the prices they must pay for them, and therefore to contend that but for "mismanagement" expenditures for these items would be so enormously reduced would be manifestly absurd. Whether Mr. Lauck really means to be understood as taking this position we are unable to tell from his documents, but this is what they imply.

The largest item in his estimated possible savings is one of $272,500,000, which he claims could be made by "modernizing locomotives." He says there have been available for the last ten years devices which have demonstrated beyond question their ability to effect large savings. This is true, but it has no real relationship to his estimate of the amount that could be saved by the universal use of these devices. The figure of possible saving he gives is merely a wild guess based upon nothing tangible except his desire to show mismanagement.

Furthermore, the figures he himself gives disprove his imputation that the railway managements have not largely taken advantage of the availability of these devices. There are about 65,000 locomotives in the United States. Even the oldest of the devices to which he refers have been available in practical form for only about ten years, and others for shorter periods. In this comparatively brief time 35,000 locomotives have been equipped with superheaters, 43,000 with brick arches, 37,000 with automatic fire doors and 15,000 with power reverse gears. Many other improvements have been made which might be mentioned. Never before in the history of the railroads of this or any other country were steam locomotives and the service rendered by them improved as much as they have been in the United States within the last ten years. And yet, because more improvements have not been made Mr. Lauck roundly denounces the railways for alleged "mismanagement!"

Besides condemning the railways for not having raised all their locomotives to the highest possible point of efficiency, Mr. Lauck condemns them as being wasteful because they have not standardized all their freight and passenger cars, brought all their engine terminals up to present needs, installed all the machine tools needed in their shops, perfected the power plants of their shops and standardized all the materials used in maintenance of way. His assumption that general standardization is desirable is simply an evidence of his ignorance, since the extent to which standardization

should be carried in any branch of railroading is still recognized by experts as a debatable question.

As to improvements in locomotives and in engine terminals, the installation of needed machine tools in shops, the improvement of power plants, and many other things mentioned by Mr. Lauck, they can be made only by the investment of large amounts of new capital. New capital can be raised only if net operating income is earned to pay a return upon it. With the exception of the years 1916 and 1917, the railways have never had a net return which approached adequacy since 1910. The only way their net return can be made adequate now is by reduction of the present operating expenses. Adequate reductions cannot possibly be made in the near future in present operating expenses without reducing the payroll. But Mr. Lauck opposes all reductions in the payroll. Therefore, at one and the same time he denounces the railroads for alleged wastes due to mismanagement and opposes the only means by which they can be enabled to eliminate the larger part of the wastes which he charges exist, and many of which unquestionably do exist.

The kind of intelligence and fairness Mr. Lauck manifests throughout his discussion is strikingly illustrated by what he says under the heading, "Train Operation." "High powered locomotives have been developed with zeal," he remarks, "but the corresponding efficiency of train loading has been overlooked. It is a case of being all dressed up and no place to go." Now, the fact is, that the average train load increased from 475 tons in 1915 to 728 tons in 1920, or over 53 per cent in five years—which, of course, Mr. Lauck does not mention. Meantime, Mr. Lauck's clients, the labor unions, did all they could to defeat this increase in efficiency by trying to secure the passage of legislation requiring the employment of extra men in train crews, or legislation reducing and absolutely limiting the length of freight trains and thereby reducing or limiting their loads. As an example of hypocrisy, the criticism of the labor unions' own "economist" that the railway managements have not sufficiently increased the average train load is a "pippin." In no other respect has the efficiency of management been more strikingly demonstrated than by these increases in train loading in spite of constant labor union opposition.

Among the largest items in Mr. Lauck's list of estimated savings is one for loss and damage. Being a defender of government control, he makes no reference to the fact that the increase in freight claim payments from $35,000,000 in 1917, to $106,804,000 in 1919, or 205 per cent, which he mentions, occurred under government control. He quotes the *Railway Age* as authority for the statement that a 50 per cent reduction can be made in loss and damage. He makes no mention whatever, however, of the many columns of information published in this paper and elsewhere showing that immediately after the return of the railways to private operation the American Railway Association organized, and has since been conducting, a special bureau for the express purpose of carrying on a campaign to reduce by 50 per cent the enormous item of loss and damage which developed under government control.

Far be it for the *Railway Age* to contend that under good management economies as large as Mr. Lauck has estimated can not be made. But even though all the needed capital were available, it would take years to make the improvements in the physical plants which would be required to effect the large economies he claims are possible. If, therefore, no reduction in the payroll were to be made, as Mr. Lauck contends should be the case, until all these other economies had been effected, the present payroll would have to be maintained without diminution for years to come, regardless of its intrinsic reasonableness or unreasonableness.

But the maintenance of the existing payroll and the effecting of the various economies Mr. Lauck himself advocates would be incompatible. In the first place if the present payroll should be maintained this would render it impossible for the railways to earn the net return necessary to enable them to make the improvements Mr. Lauck says should be made. On the other hand, if these improvements should be made and the economies they would render practicable should be effected, these economies would result chiefly from reductions in the amount of labor that the railways would have to employ, and from consequent reduction of the payroll. Mr. Lauck mixes up economies in the purchase and use of fuel and supplies, and in the use of labor, without apparently knowing at any given time which kind of economy he is talking about.

The more the documents he has presented to the Railroad Labor Board are studied by persons who know anything about the railroad business, the more admiration they will have for the colossal gall he has shown by the way he has dealt with the problem of railroad efficiency and economy, and the more they will be impressed with the unscrupulous lengths to which labor union leaders are willing to go in their propaganda against private management and in favor of the Plumb plan.

Boston & Maine

THE ANNUAL REPORT of the Boston & Maine for 1920 shows that this carrier is far from being in a particularly happy position, despite the progress that has been made during the administration of President Hustis both in the way of improvements to the physical property and in the financial structure. The fact that the railroad is confronted with serious difficulties of various kinds is not a new one. It has been given no small amount of attention of late in the hearings before the Interstate Commerce Commission in the New England divisions case and in the more recent hearings before the New England governors' committee.

The Boston & Maine in 1920 did the largest freight and passenger business in its history. The handicaps which have characterized the aftermath of federal control on the railroads of the country in general, combined with the special conditions which have had to be met by the New England roads, were such, however, that the operations for the year resulted in a deficit of imposing proportions. The amount of the deficit may be stated in various ways, but in whatever way it may be stated, it looks equally serious. Suffice it to say that if there had been no federal compensation or guaranty, the deficit after the payment of taxes, interest, etc., would have been no less than $17,132,482. Taking into consideration the standard return for January and February and the guaranty for the six months of the guaranty period, the corporate income account shows a deficit amounting to $1,364,693 after the payment of $1,227,948 of dividends on preferred stock.

Even at the risk of repeating what has already been given considerable attention in the *Railway Age,* it may be worth while to touch briefly upon the special conditions which confront the New England roads and the steps that are being taken in the attempt to compensate for them. The special conditions are principally the high costs of fuel, the increased rates which have to be paid on such fuel as is delivered by rail and the fact that the New England lines are short haul terminal lines; as such, they are subjected to large debit balances for the hire of freight cars, and it is well known that terminal labor costs have risen out of proportion to labor costs in general. The debit balance for the hire of freight cars on the Boston & Maine in 1920 was no less than $3,866,947; the size of this figure is perhaps best shown by the fact that the interest on funded debt was $5,272,223.

The steps that have been taken by the New England lines

to compensate for these difficulties have been varied and insistent but thus far without measurable success. They include an attempt to secure larger divisions on through rates, which matter is now pending before the Interstate Commerce Commission. An attempt has been made to secure a payment from the Central freight association and trunk lines amounting to $15,000,000 annually pro-rated among the connecting carriers and covering the period from March 1, 1920, to March 1, 1922. This matter also is pending and does not seem to be making noticeable progress. The latest step is a proposal to increase freight rates and passenger fares within New England by an amount equal to 10 per cent, with exceptions on certain kinds of traffic; this is the question which is now being investigated by the committee of 30 appointed by the governors of the New England states and known as the governors' committee.

An increase of rates would be most inopportune at this time, and naturally it is being met with great opposition on the part of the New England shippers. The fact that the carriers have taken the step of asking for it shows, as nothing else could, how desperate is their situation. It is evident, nevertheless, that no matter what one may think about the efficiency or the methods of the New England carriers, they must have relief of some kind if they are to continue to function. The importance of the facts stated is brought out even more pointedly when it is realized that in the first two months of the present year, the Boston & Maine had a deficit after rentals of no less than $3,027,756.

The year 1920 was a rather busy one for the Boston & Maine from the standpoint of financing. Between June 1 and October 1 there matured bonds and notes to the amount of $26,449,000, of which $17,606,000 was represented in Boston & Maine 5 per cent series A mortgage bonds due July 1 and $8,843,000 in bonds and notes of subsidiary companies. The latter maturities were met by a loan from the revolving fund for $5,000,000 and an agreement whereby the holders of the maturing obligations agreed to accept 50 per cent of their holdings in cash and 50 per cent in new 10-year general mortgage bonds, payable June 1, 1930, bearing interest at 6 per cent, which agreement was accepted in spite of the prevailing conditions in the money market.

The $17,606,000 Boston & Maine bonds were refunded by Boston & Maine 6 per cent mortgage bonds to the amount of $17,606,000 at 98½ taken by the United States government, in compliance with the agreement with the director general in connection with the reorganization plan. Bonds were also issued to the director general for $8,000,000 on account of expenditures for additions and betterments during federal control. Other financing included a loan from the revolving fund amounting to $1,212,500 for new locomotives and one for $5,443,979 for improvements to way and structures and equipment. The Boston & Maine was allocated by the Railroad Administration 500 box cars, 1,500 gondola cars and 20 Santa Fe type locomotives. The equipment trust notes covering this equipment amounted to $5,329,500.

The changes which have been made in the financial structure of the Boston & Maine in recent years are well known. They are embodied in the fact that prior to the receivership in 1916 and the subsequent reorganization, the great burden of the road was its rentals for leased lines, amounting in 1916 to no less than $5,626,029. When the road was reorganized, effective as of January 1, 1919, the finances had been changed so that there was exchanged for the stock of the leased lines preferred stock of the Boston & Maine. The rent for leased roads in 1920 was but $927,845, a reduction of nearly $5,000,000 from 1916. When the leased roads were acquired, the Boston & Maine, of course, took over their bonded indebtedness, amounting to $39,330,000. Including the indebtedness incurred during federal control, the total long term debt on December 31, 1920, was $123,775,084. At the end of 1916 it was $43,338,000. The interest on funded debt in 1916 was $1,754,980 and on unfunded debt $970,497. In 1919 the interest on funded debt was $5,272,223 and on unfunded debt $18,857, an increase as between the two years of about $2,500,000.

Even with the changes in indebtedness following federal control and the increase in interest charges caused by the 1920 refunding, the decrease in fixed charges has been over $2,000,000. In 1920 the dividends paid on preferred stock amounted to $1,227,948, of which about $1,000,000 was paid on the preferred issued to the former holders of stock in the leased lines. These dividends were all declared in the first part of the year; the dividends for the latter part were passed because of the conditions at that time. It will be seen that the holders of this preferred stock have thus made a sacrifice that it would seem is more than railroad security owners should, in all fairness, be asked to make. The fact that they have suffered in this wise is only another indication of the seriousness of the situation on the Boston & Maine.

It has been aptly said that under present conditions the problems of operation represent only about 2 per cent of the problems of the Boston & Maine, and finances, etc., the other 98 per cent. Even with this in mind, however, it is worth while making a note of one of the important improvements in operation which have recently been made. This is the introduction of Santa Fe locomotives on the Berkshire division between Mechanicville, N. Y., and East Deerfield, Mass. The Berkshire division is the Boston & Maine's connection with the west, and it is practically the main stem of the Boston & Maine system. To put these Santa Fes in service required the strengthening or rebuilding of no less than 44 bridges between East Deerfield and Rotterdam, N. Y. A larger turntable was put in at Rotterdam and improvements in the engine terminal at East Deerfield included the addition of 11 stalls. The Santa Fes have not been in operation a sufficient length of time to show what they may be able to do. They are hauling trains that were formerly handled by two Consolidations and, inasmuch as the Berkshire division has no heavy grades, the improvement in train loading should be a marked one. The road has also made improvements on other parts of its line, but these on the Berkshire division are the most interesting. The Boston & Maine has been handicapped in the past by lack of motive power of the most modern type. The operation of these Santa Fes will therefore be watched with interest.

It has been noted above that the Boston & Maine in 1920 did the biggest freight and passenger business in its history. The revenue ton-miles amounted to 3,705,528,286—an increase of 12.52 per cent over 1919 and an increase of 2.57 per cent over 1918, the best previous year. The total number of tons of revenue freight carried in 1920 were 27,186,674, the average haul was 136 miles and the average revenue per ton-mile was 1.439 cents. The average revenue train load was low, being but 479 tons, but this was an increase over the average of 472 tons in 1919. In view of the conditions governing on the Boston & Maine, with its large mileage of branch lines and the fact that it is a terminal road, it is to be expected that we should see figures of but 23.2 tons per loaded car; 17.5 miles per car per day and ton-miles daily per car amounting to but 294.

The Boston & Maine, although to a lesser extent than the New Haven, is distinguished by its proportionately large passenger business. The total number of passengers carried in 1920 was 54,933,009. The revenue passenger miles totaled 1,014,734,717—an increase of 3.96 per cent over 1919, the best previous year. The average distance carried per passenger was 18.47 miles, the average number of passengers carried per train mile was 97.81 and per car mile 25.66. The report gives the interesting detail that there were carried in and out of Boston in 1920 no less than 33,913,598

passengers, which is presumably the record for any passenger station used by one road, although it is possibly exceeded by the New Haven's business handled in and out of South Station in Boston, that station being used by two roads.

The principal figures for operation in 1920 as compared with those for 1919 are as follows:

	1920	1919
Mileage operated	2,256	2,258
Freight revenue	$53,306,738	$43,303,141
Passenger revenue	24,680,435	22,116,094
Total operating revenue	86,652,745	72,935,146
Maintenance of way expenses	15,093,264	9,612,460
Maintenance of equipment	20,168,923	15,287,526
Traffic expenses	704,051	498,722
Transportation expenses	51,348,806	38,437,592
Total operating expenses	90,989,433	67,144,063
Net from railway operations	Def. 4,336,687	5,791,083
Taxes	3,001,087	3,043,388
Operating income	Def. 7,385,901	2,746,634

The corporate income account is as follows:

Gross income	$11,223,995	$8,453,456
Interest on funded debt	5,272,223	3,419,337
Interest on unfunded debt	18,857	1,008,970
Total deductions from gross income	10,609,265	5,795,933
Net income	614,730	2,657,523
Dividends	1,227,948	2,035,716
Net balance	Def. 1,364,693	525,248

New Books

Handbook of Building Construction, by George A. Hool and Nathan C. Johnson. In two volumes totaling 1,474 pages, illustrated. 6 in. by 9 in. Bound in flexible leather. Published by the McGraw-Hill Book Company, 239 West Thirty-ninth street, New York City.

Physically this work consists of two separate volumes, but in the arrangement and treatment it is essentially a single treatise since the page numbering is continuous from one volume to the next and the table of contents in Volume I and the index in Volume II refer to both books. The title "Handbook of Building Construction" quite properly describes the contents of the two volumes and the brief preface in Volume I declares that the book is designed as a reference work for the architect, engineer and builder. It would seem, however, that the needs of the engineer or truly engineering requirements are given the most generous consideration. It is true that under the head of "General Design Data" at the end of the first volume, architectural design is given some space including charts of the "orders" and typical floor layouts of structures for various purposes; there are also details of mail chutes, plunge baths, window frames, doors, etc., but in the main the first volume is concerned with the structural design of buildings composed of steel, concrete or wood, rather than with architectural design while a large part of the second volume is devoted to the design and layout of the heating, plumbing, ventilating, lighting, telephone, elevators, sanitation, etc. While the first 79 pages are devoted to the elements of structural design, this is of value primarily as a general review or handy reference rather than with the idea that it would enable the novice to acquire a thorough working knowledge of the subject.

The first 86 pages of the second volume are devoted to all manner of construction equipment used in building construction, including the excavating machinery used for taking out the foundations. The next 140 pages are devoted to general information on various building materials, including tables of standard sizes and styles and physical properties. This is followed by a number of chapters on estimating contract specifications, etc., while the remaining portion of the book is devoted to the special trade or auxiliary features of buildings referred to above. The subject matter as a whole bears the mark of authoritativeness and accuracy, references to marine borers which cover only the effect along the North Atlantic seaboard without any reference to the more serious attacks to the Gulf and Pacific coasts being an oversight of a nature that may be expected in any work covering so broad a field as this handbook.

Letters to the Editor

Some Suggestions as to the Sixteen Points of Decision No. 119

NEW YORK.

To the Editor:

The decision of the United States Railroad Labor Board, No. 119, is offensively objectionable in that it forces the recognition by the railroads of union labor and imposes the conditions of a closed shop. This is the more offensive in view of recent history—such a recognition of the unions was refuted by the United States War Labor Conference Board. Mr. Gompers withdrew from and broke up the President's First Industrial Conference because of its refusal to give such recognition and the President's Second Industrial Conference avoided the difficulty by making no mention of it.

It was frequently said of the Director-General's administration that he was apparently far more concerned with organizing the railroad employees than he was with their efficient operation.

The decision is further objectionable in its lack of firm definiteness and its 16 points are open to the objections made by Secretary Lansing, of President Wilson's famous 14 points. Said Lansing, "When the President talks of self-determination, what unit has he in mind? Does he mean race, a territorial one or a community? Without a definite unit, which is practical, application of the principle is dangerous to peace and stability. . . The phrase is loaded with dynamite—it will raise hopes that will never be realized."

Secondarily, what does the United States Railroad Labor Board mean by saying that, "There shall be a proper classification of employees and a reasonable definition of the work to be done . . . but shall not *unduly impose unnecessary conditions* upon the carriers," or again, "The principle of seniority . . . should be so applied as not to cause *undue impairment of the service.*"

What about dynamite, hopes and disappointments?

I should like to make the following suggestions regarding handling of negotiations with maintenance and other employees (except train service) in the preparation of agreements covering working conditions.

Decision No. 119 handed down by the United States Railroad Labor Board on April 14, 1921, terminates the national agreements and all rules and working conditions thereunder enforced by authority of the Director-General or extended by that of the Labor Board. This in effect makes necessary the consideration of rules affecting all classes of labor embraced in said decision.

In the negotiation of agreements with employees in the maintenance of way and maintenance of equipment departments, and others, each road is required to negotiate its individual agreements, but in order that all may give consideration to the same important principles, roads should immediately call together the officers who will conduct the negotiations. It is suggested that general consideration be given to the following, believing that in agreements of this character there should be as few rules as possible and these confined to the basic principles of the schedules:

The present national agreements with the Federated Shop Crafts alone comprise 186 rules, and those with the other crafts are relatively as bad.

Generally, these agreements are objectionable as violative of economic and efficient production in the following particulars:

First. They fix compensation upon an hourly basis, eliminating piece-work, bonuses and other methods of incentive

to individual effort, which should be restored by such roads as desire to avail themselves of them, and should not be contracted away by any road.

Second. The business of transportation is conducted 24 hours each day for 365 days in the year. The business of production, except farming, is practically limited to periods of from eight to ten hours daily, customarily for about 300 days each year. It is further subject to substantial fluctuations in the volume of traffic moving over a series of years and much of the traffic is seasonal in each year. Wide latitude must, therefore, be exercised by management in the disposition of the railroad forces in order to adjust the one situation to the other.

Third. In the last 20 years, in no year of depression has the ton-mileage declined more than 10 per cent, and in but one year—1916—has the ton-mileage increased more than 20 per cent (when it amounted to 23.9 per cent), the largest other increases being in 1910, 16.6 per cent, and in 1906, 15.7 per cent. It would, therefore, seem very desirable as a means of stabilizing labor conditions that the standard workday range between eight hours and ten hours, no reduction in forces being made in times of depression until they have been placed upon an eight-hour basis, and no increases in forces being made in times of business activity until the hours of labor have been increased to ten. Payment of overtime is a very questionable device, and in any event should not be allowed until the time is increased beyond 55 hours per week or for unusual service.

Fourth. No restrictions of lap-shifts should be permitted and the many methods for securing payment of overtime on Sundays, holidays, emergency work, travelling, etc., under which the overtime, which is never less than 1½ times the regular rate, may be increased to as much as five times the regular hourly rate, should be eliminated; so also the unreasonable travel expense allowances. Where employees are called and cannot then be employed upon the work for which they were called and there is an arbitrary allowance, provision should be made for their use in other occupations during the time paid for.

Fifth. While reasonable recognition should be given to seniority, it should be entirely and definitely subordinated to the judgment of management, as to the capacity, capability and productive efficiency, reliability and loyalty of the employee, and this whether the forces are to be reduced or enlarged, and the demoralizing effects of "bumping" and other practices to which it has given rise, should be avoided.

Sixth. All rules which interfere with discipline or weaken control of management, should be eliminated. No employee should be permitted to lay off without first securing permission.

Seventh. No payment should be made for punching time clocks, time consumed in receiving payment of wages, time consumed for lunches and other meals, or other time not worked known as "bonus time."

Eighth. The employment of men must not be restricted by labor union conditions as to apprenticeship and other qualifications, long experience having fully demonstrated the ability to prepare men for much of the maintenance work in a comparatively short period. Equally, management must not be hampered by labor union restrictions as to the "right to a job." All the work, if within the capacity of one individual, should be performed by him and to the extent possible full freedom should be given for the employment of handymen and apprentices under the direction of or associated with skilled labor.

Ninth. There should be a definite separation of all the forces of management down to and including gang leaders. These men should not be permitted to become parties to any agreement between the company and its employees. They should be definitely excluded from association with or obligation to the employees, their sole interest being that of management and their sole duty being to the employing company; nor should there be any restriction upon their engaging in and doing the work of an employee where their services can be in that manner utilized.

Tenth. Rules which limit the initiative of management in prescribing conditions under which new men are employed, have no place in agreements with employees. All employees shall be required to furnish full statements as to their employment over a period of five years, and shall pass physical and mental tests, including those of eyesight and hearing, it being in the interest of safety of life and property and of management to have full information as to the health, habits and association of persons entering its employment, as well as their qualifications and fitness for the particular places they are to fill; and this not only to prevent fraudulent claims in cases of personal injury and the undue loading of pension lists, but to protect others from communicable diseases which might endanger their health and even their lives.

Eleventh. That the agreements run for one calendar year, but that all wages be subject to revision on 30 days' notice to keep pace with changes in the cost of living until more normal conditions are restored. EXECUTIVE.

Bettering Train Movements By Telephone

CHICAGO.

TO THE EDITOR:

In an editorial entitled, "Bettering Train Movements by Telephone," in the *Railway Age* of February 25, attention is called to the serious delays which often occur to freight trains after being made up, because of poor facilities for delivering running orders preliminary to their departure. It is stated that, to overcome this condition, one road has installed telephones, connected to the dispatcher's circuit, at outgoing ends of certain busy yards, so that when a train is made up and ready to leave, the conductor can communicate directly with the dispatcher who gives him his running orders, the conductor copying these orders and, after completing them, depositing one copy in a box provided for the purpose.

While it is true that at some points freight trains are delayed in this manner, which in turn results in delays to other trains on the line, and the suggestion that these delays be eliminated or reduced is a good one, it can not be done (without limiting conductor's hours of service) in the manner in which it is stated that one road has undertaken.

To require the conductor to copy train orders, receiving them over the telephone, as a regular thing and not in emergency, and as it is said this road will do, would restrict his hours of service to those prescribed by the hours of service act for operators, train dispatchers and others handling train orders. (See Interstate Commerce Commission's Conference Ruling 342, February 12, 1912.) The matter is of such importance I feel I should call your attention to it.

W. N. N.

THE GREATEST NUMBER of immigrants into Canada during 1920 came from Ireland. The total immigration from 64 countries in 1920 was 147,502, of which 98,636 entered via ocean ports, and 48,865 from the United States. Of this number, 49,248 came from England, 19,496 from Scotland and 61,112 from Ireland.

AN ACTIVE CAMPAIGN for the extension of Canadian trade will be undertaken by Canadian trade commissioners in Europe this summer. Plans have already been made to cover Norway, Denmark, Sweden, northern Africa, Spain and Portugal, while an intensive campaign will be carried out by the Canadian trade commissioner in London among British buyers.

Fig. 1—Panoramic View of Estaires, a Town in the Coal Regions of Northern France, Showing the Cleaning Up Process Well Under Way and Reconstruction Started

War's Devastation Aids Railway Reconstruction

Depreciated Land Values in Ruined Sections of France and Belgium Permit Increased Facilities

By Oliver F. Allen
Formerly Major of Engineers, American Expeditionary Forces

PREVIOUS ARTICLES of this series have dealt with the rebuilding of bridges and tunnels in the devastated regions of France and Belgium (*Railway Age* of April 8 and April 22). This was described as one of the first steps taken in the reconstruction program of the railways after the lines had been opened to traffic with only those structures and facilities which were absolutely necessary for operation. The problem of rebuilding the yards and terminals had next to be solved and it is now proposed to give some attention to this phase of the reconstruction work.

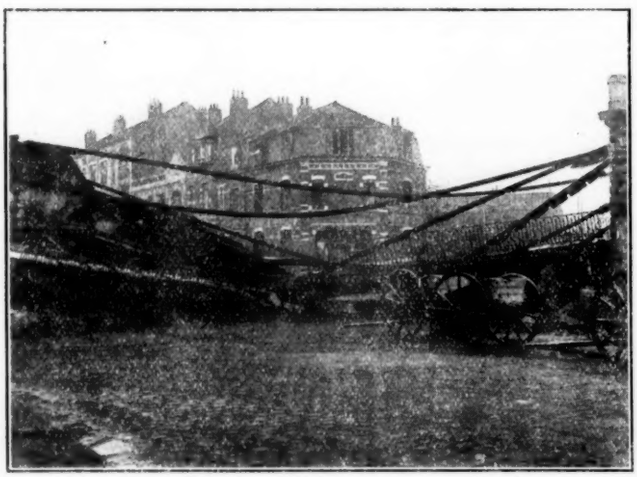


Fig. 2—A Destroyed Steel Railway Bridge at Lille

Railway engineers always face a difficult problem when trying to provide increased facilities in thickly populated districts. The industrial growth which creates the demand for increased facilities at the same time raises property values and fixes factory centers. Space is rarely saved for future railway extensions, and betterments are usually a compromise between traffic requirements, interference with existing industrial plants, destruction of valuable buildings, utilization of important sites and the funds available for the improvements.

A unique result of the terrible destruction in the north of France has been the opportunity to take property at a low valuation without interference with industry. The destruction of many communities has been so complete that neither industrial plants, residences, nor even streets have survived. This is illustrated by Fig. 1, showing the destruction at

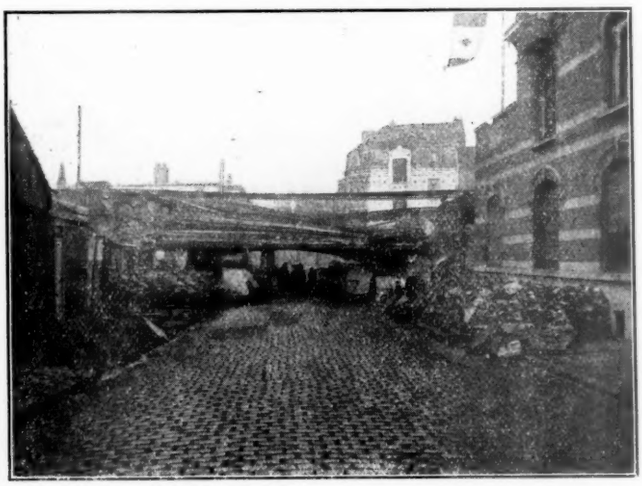


Fig. 3—Further Destruction of Steel Bridges at Lille

The debris of the destroyed abutments has been cleared away to allow military truck trains to use the street.

Continuation of Photograph Shown on Opposite Page—Temporary Buildings Being Used as Homes, Stores and Offices—Destruction of This Sort Made the Relocation of Railway Tracks and Terminals Possible

Estaires after the cleaning up process was partially completed. Inasmuch as both factories and railroad terminals have to be rebuilt, it is possible not only to enlarge facilities comparable with the increase in traffic, but to rearrange things so as to facilitate greatly the rapid and easy movement of both freight and passengers. In many cases where the destruction of a town or city was only partial, it was worst near the railway. This depreciation in value of property adjacent to both freight and passenger stations has enabled the French railways in the devastated regions to purchase additional land not only for present requirements but for further anticipated growth during the next 20 to 30 years. The government has assisted in this work and it was started so early that several thousand projects outlining anticipated requirements for the next generation have been studied with sufficient detail to justify already the purchase of the required property.

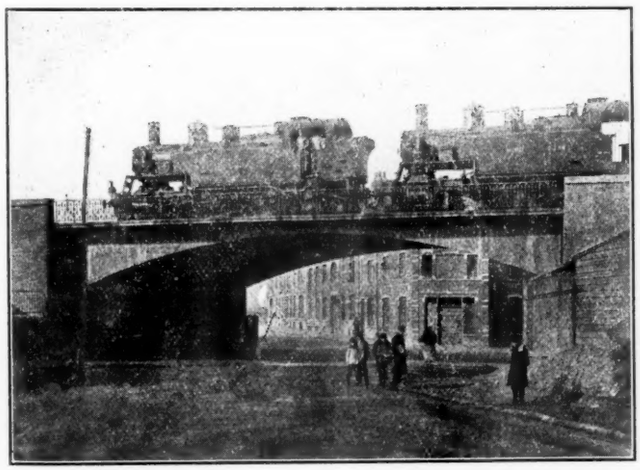


Fig. 4—Reconstructed Bridge at Lille

Same as that shown in Fig. 2. The arches are very flat and the concrete very thin at the centre. The iron balustrades have been salvaged and used.

Not only are bigger transfer yards, passing tracks and sidings required because of the growth in industry, the use of the bigger trains, etc., but they are demanded by changed labor conditions. For instance, under pre-war conditions at the transfer points adjacent to the coal mines trains could be made up and dispatched as cars came in from the mines without regard to the time of day or Sundays and holidays. While the eight-hour day is sometimes used principally as a means for getting higher pay while still working ten or eleven hours, the tendency is, of course, toward the shorter day. The railroads are contemplating conforming to eight-hour laws in such a way as to move the maximum tonnage with one or two shifts with the minimum amount of Sunday and overtime labor. They are, therefore, in such places as Lens taking advantage of the destruction to increase greatly the capacity of the transfer yards so that incoming local coal trains can be made up into through trains and stored for 36 hours if necessary. The train crews can go on duty at regular hours and the storage capacity will be sufficient to avoid sending out many coal trains on Sundays. Trains will be sent out in rapid succession at such hours as will result in the minimum labor cost for their crews between the coal fields and Paris or other large centers or junction points.

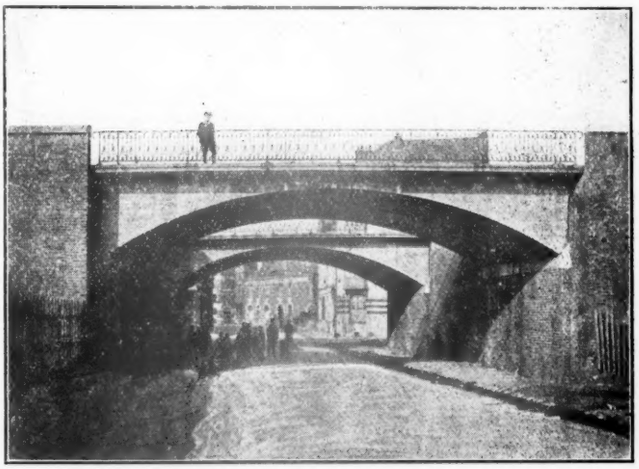


Fig. 5—New Reinforced Concrete Bridges at Lille

These structures replace those shown in Fig. 3.

A typical case of taking advantage of the war's havoc where the destruction of the city was only partial is at Lille. The map, Fig. 6, shows the pre-war railroad arrangement. Four double track lines fanned out toward the south. The one at the western extremity led via Bethune to the center of the coal fields and metallurgical industry of the north. The

one to Paris made the most direct connection to the capital. The one to Valenciennes traversed the areas largely given up to textiles and vitreous products, including Mons and other large towns in that direction. The fourth swung off to the east toward Tournay and so to the central parts of Belgium. Another line led to the northwest, in the direction of Dunkirk and Calais, and the sixth, northeast in the direction of Ghent and Antwerp, in Belgium.

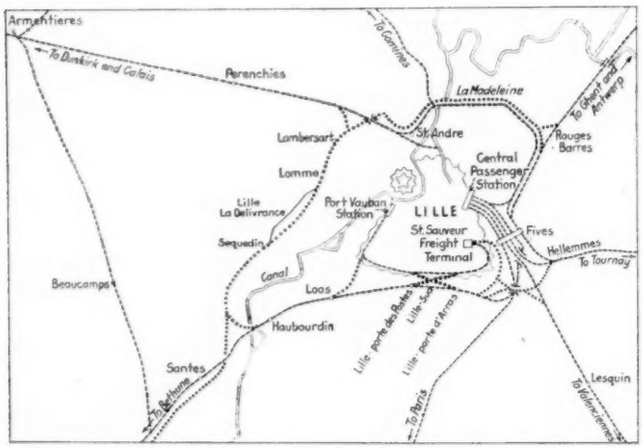


Fig. 6—Lille Before the War

Existing railways indicated by broken line and projected extensions by dotted line.

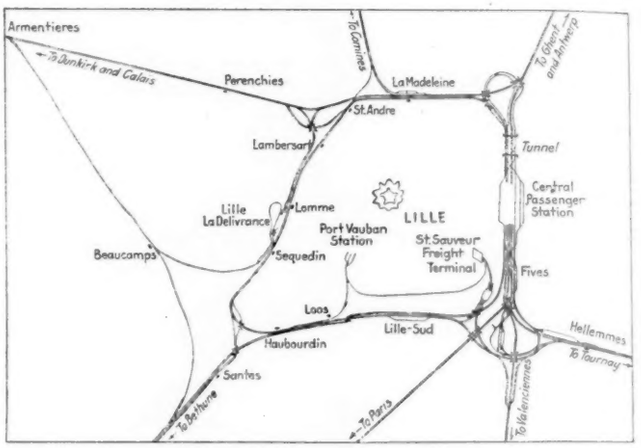


Fig. 7—Lille After the War

Showing Improvements Completed by the Northern Railway in February, 1920. A comparison with Fig. 6 will indicate the improvements.

The central passenger station was a stub end terminal. The principal freight station at St. Sauveur was also a terminus and the facilities for getting from some of the lines to this yard were very inadequate. There was another freight terminal, the Port Vauban station, which was equally difficult of access.

Before the war, improvements as outlined by the dotted lines on Fig. 6 were contemplated. These included shops and transfer yards at Lille-la-Deliverance and large transfer yard at Rouges Barres. This pre-war program contemplated only the partial elimination of grade crossings of intersecting lines, and the abandonment of the stub end passenger station would have been so expensive that it was not even considered. The lines came into the city above the street grade before the war and their destruction was very complete as shown by Figs. 4 and 5. These old steel bridges were rebuilt with reinforced concrete as described in the preceding article in this series (*Railway Age*, April 22, page 973) and the completed structures are shown in Figs. 4 and 5.

Taking advantage of the destruction the management decided to build a comprehensive belt line around the city, to abandon the old central passenger station site and to build nearby a new station with through tracks. The relocation of lines decided upon includes an arrangement of the through tracks so that trains from and to all six lines mentioned above, as well as on the less important suburban and branch lines, and through trains over any combination of these lines, can come into town, pass through the station and go out again without passing over any grade crossings at intersecting lines or streets, and without changing direction.

The two main freight terminals are retained but are so connected as to improve and expedite the handling of both incoming and outgoing freight. The map, Fig. 7, shows the new arrangement. The southern part of the city not economically served by the Port Vauban and St. Sauveur freight stations will be taken care of by new freight and passenger stations at Lille-Sud midway between the existing stations of Lille-Porte-des-Postes and Lille-Porte-d'Arras, shown in Fig. 6, which will be abandoned. The connection inside the fortifications between St. Sauveur and Port Vauban will be retained. The loop around the western and northern sides of the city is located substantially as projected before the war, but arranged to handle traffic quicker and easier. A loop has been added to the cut-off between the Bethune line below Santes and Armentieres by way of Beauchamps where it is brought over to the new transfer yards at Lille-la-Deliverance.

The connections on the east side of the city have been greatly modified on account of providing for through traffic, both freight and passenger.

Classification yards, storage tracks and repair shops are provided southeast of the city at Hellemmes, not far from the new passenger station and the St. Sauveur freight terminal.

The next article of the series which will continue the discussion of the rebuilding of yards and terminals in the devastated regions will appear in an early issue of the *Railway Age*.

PRESIDENT OBREGON signed an order on January 26 transferring the administration of the National Railways of Mexico from the Department of Communication and Public Works to the Treasury Department.

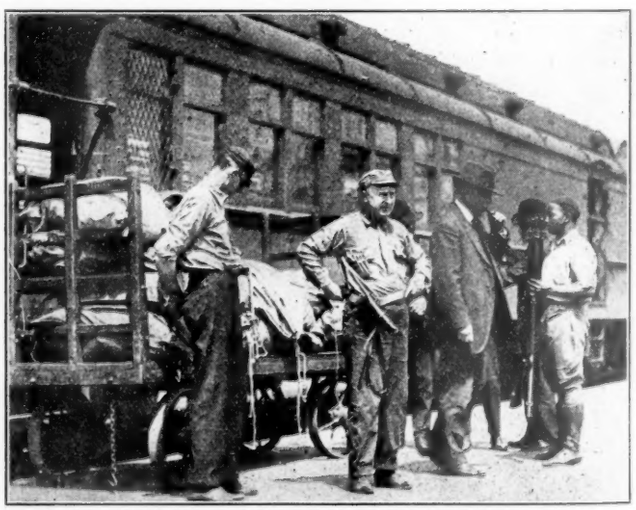


Photo from "International"

Armed Postal Employees Guarding Mail

Needed Improvements in Locomotive Design*

Operating Conditions Demand Large Units Which Introduce Difficult Problems in Design and Maintenance

By H. W. Snyder
Mechanical Engineer, Lima Locomotive Works

No one, it is believed, will dispute the fact that present day operation of high-power locomotives is one of the most vital questions with which our railroads are concerned. The demands of constantly increasing passenger and freight traffic have brought about a constant increase in size and power of our locomotives.

In view of the rapid strides that have taken place in increasing the size and power of locomotives within the last few years, it seems rather out of place to predict that the maximum has been reached. It is also true that the use of improved devices has made possible the satisfactory operation of the large locomotives of today. Everything seems to indicate that we have not reached the maximum capacity of the locomotive even within the present limits of clearance and rail load, and we may expect to see these same engines made far more powerful and economical by the application of devices which are now available or which are already being given serious attention.

In view of the foregoing, the most vital matter which confronts locomotive designers and operating officials is that of increasing the capacity as well as the efficiency of the locomotives which we have today. In many ways these problems have already been attacked and great improvements are continually being made.

In the following paragraphs an attempt will be made to bring to attention some of the problems which our present day locomotives bring forth and upon the proper solution of which depends their success.

Combustion and Steam Generation

In order that large engines may operate properly, it is of course necessary that a sufficient supply of steam be furnished to cylinders so that they can be made to produce their maximum horsepower. It is not enough to provide a given number of square feet of heating surface in the firebox and the tubes so that we may be reasonably certain that sufficient water will be evaporated to supply the cylinders. It is, however, necessary that we take into account proper construction of the boiler, necessary firebox volume to produce the best possible combustion of fuel, and the design of grates so that fuel will be economically burned to such an extent only as required by the maximum evaporation of the boiler.

In producing heavy motive power it has been necessary on account of prohibitive axle loads to apply a sufficient number of axles under the engine to reduce the individual axle load to within reasonable limitations. This has lengthened out the engine to such an extent that boiler design and maintenance has become a serious problem. In the first place, it is necessary to design a boiler that will properly function with the other vital parts of a locomotive. At the same time the length has become such that the use of combustion chambers is a necessity to avoid a prohibitive length of tube. Large engines have been constructed with a tube length of 25 ft. and it seems that no definite rule has been established as to what the limit of length of tube of a given size should be. Experiments have been made on this subject and it has been said that the maximum length in inches of a tube of a given size should be approximately 100 times its diameter in inches. It would seem that this is as nearly correct as any general rule which has been devised and one which can be readily followed.

The author does not feel that any definite rule should be made in regard to length of tubes, for this might bring about a condition whereby other vital features of the engine would be involved in order to abide strictly to the length as noted above. Tubes 2 or 2¼ in. in diameter in excess of 20 ft. in length are questionable, and this feature should be looked into carefully before a decision is reached.

The advent of long combustion chambers has brought along with it the necessity for increased attention to boilers. The application of a long combustion chamber requires a large number of additional staybolts and it would naturally be expected that a boiler of this kind would require more staybolt attention. For this reason, if for nothing else, there is no doubt that a proper installation of flexible stays in the firebox and combustion chamber will prevent a great deal of the staybolt trouble which has been experienced in the past. Although long combustion chambers require more attention in maintenance this will be offset by the increased firebox volume and the resulting better combustion.

On account of height limitations, the height of the dome as well as the steam space in the boiler has been reduced to such an extent that difficulties are being encountered with the proper life and maintenance of superheater equipment, because too much water is drawn over through the throttle into the superheater. This is a question requiring experiment to determine as nearly as possible the minimum steam space which should be provided for boilers working on various grades.

Increased Capacity Needed Without Increase in Size

As noted above, it seems that we have about reached the limit of size of cylinders and size of boiler due to road clearances. To undertake to provide additional road clearance on practically all of the main lines today would mean a total expenditure of money, entirely out of proportion to the benefits that would accrue.

On account of the apparent limitations of piston thrust and road clearances the greatest problem with large locomotives today, is to increase their capacity without exceeding greatly present sizes. Anything to increase the hauling capacity of the locomotive without increasing the height and width limitations under which the locomotive must work might be called an essential capacity-increasing device. A few of these with which we are most familiar and which have proved beyond doubt their desirability are the superheater, the brick arch and the mechanical stoker. There are possibilities of still increasing the efficiency of the superheater without increasing the size of the boiler in which it must operate. There are also possibilities and constant improvements in the design of brick arches which lend to higher evaporation and better combustion of fuel.

It has been stated that when a locomotive requires as much as 6000 lb. of coal per hour it has gone beyond the limits of the ordinary fireman. Automatic stokers have been in use so long that their dependability for heavy power is no longer

*Abstract of a paper to be presented at the spring meeting, Chicago, May 23-26, 1921, of the American Society of Mechanical Engineers.

in question. Many men are studying this particular feature of locomotive design and operation and we may confidently expect in the future a gradual increase in the efficiency of these mechanisms. As they stand today they are an unqualified success, and time and study will bring about the necessary refinements so that better combustion and less coal per horsepower will be used.

We have not as yet gone very extensively into the use of feed-water heaters. It has been proved without a doubt in foreign countries that the feedwater heater is an essential capacity-increasing device as well as an economical addition to the locomotive. In this respect, then, it would seem that we are somewhat behind the Europeans, and there is no doubt that in the near future when the economies that can be effected by the use of feedwater heater are realized it will become almost as general as the superheater today.

Another small item which has received only passing attention in this country is the variable exhaust. As is well known, a variable exhaust that can be properly operated and which will not require much maintenance attention will have a great tendency to relieve high back pressure at high speeds, and its operation will also provide the necessary draft at slow speeds. It is one of the small things that deserves consideration and study and something which it is felt will be worked out satisfactorily for the future.

The Engine Proper

There have been no radical changes in the general design of cylinders. The use of outside steam pipes has resulted in advantages both from a casting and maintenance standpoint. It would seem well worth while to consider a design of cylinder by means of which the weight could be reduced to a great extent, permitting of additional weight of other parts, and thereby increasing the capacity of the locomotive.

The design of valve gears has received a great amount of attention and many accepted types are now available. In all of these every effort has been to better the steam distribution. In maintenance we are far ahead of engines used twenty years ago. There is yet, however, much to be desired in steam-distribution and this subject will bear as careful study in the future as it has in the past.

Power Transmission

When we consider that as much as 150,000 lb. piston thrust is being transferred through a single main rod and from this into the driving wheels of a locomotive, it is not difficult to understand why troubles are experienced with main crankpins and particularly side rod bearings at the main pin. In order to provide the proper strength to take care of this tremendous piston thrust it has been necessary to design extremely heavy main and side rods. The piston thrust is not the only consideration in this connection. The inertia forces, particularly in drifting, at times reach figures that are even greater than the piston thrust. Practically all of this must be taken care of through the main crankpin and the necessary connections to the side rods at this point.

All are familiar with the large number of experiments which have been carried on to produce a steel that would give a higher elastic limit than the ordinary high-carbon open-hearth steel which was successfully used until engines reached their present proportions. The use of such steel for side rods, main rods and piston rods has been principally confined to heat-treated and quenched forgings, which permitted the use of sections which were considerably lighter than what could be used with the ordinary open-hearth annealed forgings. Steel has also been produced which gives a high elastic limit and which can be successfully used with ordinary annealing, permitting very considerable reductions in weight compared to the ordinary open-hearth steel formerly employed. The use of such a steel does away with quenched forgings and permits of rods being heated for closing-in straps and similar work without destroying the quality of the material as is the case with quenched forgings.

Main and side rods have been produced and have been in successful operation for the past few years in which the piston thrust is carried directly from the main rods to the side rods back of the main wheel. Such a design does not increase the total weight of the rods to an extent likely to cause any appreciable increased difficulties from a counterbalance standpoint.

The design of main and side rods as well as main crankpins will always be a vital question in the construction of locomotives. It has been necessary, and always will be in designing the rods for locomotives, to assume certain arbitary limits of fiber stress based principally upon past experience. It is impossible to take into account all the stresses produced in rods when a locomotive is in operation, and for this reason the allowable fiber stresses in tension, compression and bending must be taken comparatively small in comparison to the elastic limit ordinarily obtained in such forgings.

There has already been a great deal written and a number of experiments conducted regarding the proper design of rods to successfully stand up under severe usage and at the same time reduce to a minimum the ordinary difficulties presented from the standpoint of counterbalance. Hollow-bored piston rods, light designs of crosshead and piston, the use of high-tension steel for side and main rods as well as the use of hollow-bored crank pins are familiar to all. More careful attention should be paid to the quality and upkeep of rod bearings and every endeavor should be made to provide bearings of such quality and design that renewals will be reduced to a minimum.

A main pin designed properly for heavy piston thrust must be so proportioned that the length will bear a certain relation to the diameter within very close limits. On account of the necessity for keeping cylinder centers as close together as possible because of road clearances, if a proper length of main pin is obtained, its proper size presents a difficult proposition. This is one of the great difficulties which the author is confident will be overcome in the near future by the proper application of a design previously mentioned, wherein a large part of the piston thrust is transmitted directly from the main rod into the side rod.

Counterbalance

It is a very difficult matter to separate the question of counterbalance from the design of connecting rods and reciprocating parts. There is a great diversity of opinion in regard to the proper amount of counterbalance which should be applied to locomotives. The author believes that with our present heavy engines with long wheelbase it is not necessary to balance as much as 50 or 55 per cent of the reciprocating weight. In fact, it is quite possible that we may be able to counterbalance a smaller percentage of reciprocating weight than has heretofore been attempted, especially for long, heavy engines, provided the revolving weights at the main pin can be properly taken care of. Every effort, however, should be made to balance all of the revolving weights on the main pin.

The author is of the opinion that no definite set rule can be established in this regard, but that each particular design is a study in itself, and wherever revolving weights at the main pin are encountered such that they cannot be properly counterbalanced, steps should be taken to provide the best means possible of reducing revolving weights at this point as well as providing reciprocating parts as light as possible consistent with strength. This of course has been accomplished in the past by hollow-boring the main pins and piston rods and by using a light design of piston head, which in-

dicates that a steel having a high elastic limit with the proper elongation and reduction of area should be employed. The use of such steel has already proved that it can be depended upon. One of the principal fundamentals in counterbalance is to keep the reciprocating weight light.

The Running Gear

On account of the large increase in the size of cylinders of present-day heavy locomotives over those used several years ago, the cylinder centers have been spread until they have reached practically the clearance limitations of the railroads, and the necessity for larger journals to carry properly the increased axle loads has caused the frame centers to be brought nearer together.

This condition increases very materially the distance from the center of the cylinder to the center of the frame, which of itself produces greater strain in the frame and at the same time increased pressure on the driving-box bearings as well as shoes and wedges. In addition to the above, piston thrusts have increased from approximately 65,000 lb. to approximately 150,000 lb., and means must be provided to properly take care of the increased piston thrust along with the increased overhang.

While discussing the subject of frames it is hardly possible to ignore the vital question of frame cross-bracing. Substantial and sufficient cross-braces should be applied between the frames and rigidly bolted thereto to form a rugged structure which will not rattle to pieces.

It seems as though the design of driving boxes and driving-box brasses has not successfully kept pace with the rapid increase in piston thrust. We have in almost general use the same type of driving-box brass which has been standard on locomotives for years. The design is such that the brass extends about half-way down over the journal. Inasmuch as this brass must take up the piston thrust, it is very evident that we shall have trouble in taking care of driving-box brasses until a suitable design is produced—one in which the brass will cover much more of the front and back projected area of the journal than is now the case.

Guiding and Trailing Trucks in Connection With Long Wheelbase

With our present heavy Mikado and Santa Fe type locomotives the length of rigid wheelbase is almost if not quite double the rigid wheelbase in ordinary service 20 years ago. It is unnecessary to comment upon the fact that it is a difficult matter to operate such engines around curves of even comparatively small degree and at the same time prevent the rapid wear of hub liners and driving-box faces, thus increasing quickly the lateral play to a prohibitive point and necessitating work in the shop to overcome it.

Santa Fe type engines with 22-ft. rigid wheelbase are not uncommon. Engines of this type and of this size will weigh in the neighborhood of 400,000 to 420,000 lb. When we stop to think that to move this tremendous mass of material around a 16- or 18-deg. curve a force of many thousand pounds is required, is it any wonder that we obtain rapid flange wear and the necessity for returning tires before the proper amount of mileage has been obtained? In the majority of cases, it is believed, the force necessary to properly curve an engine of this kind has been applied at the front truck and the first driver. In most cases types of leading trucks have been used which produce a very small resistance on curves of small degree. In order to prevent rapid flange wear as well as to overcome the development of lateral play unnecessarily, designs have been produced which will give a high initial resistance of the front truck and provide a lateral motion for the front driver with adequate resistance so that some of the guiding force is transferred back to the second pair of drivers.

Since locomotives operate the greater part of the time on tangent tracks, it is necessary to have a high initial guiding resistance which will not be increased when curving. In other words, a flexible wheelbase is produced which has all the requisites of the ordinary rigid wheelbase, but at the same time will overcome many of the difficulties now encountered in an attempt to operate engines of this size and length. Many designs of trailing trucks have been produced with the idea in mind of helping to remedy the conditions which have been noted above. These of course have met in a way the conditions which it was necessary to overcome. There is much yet to be done in producing a trailing truck which will have the proper facilities for equalization of spring rigging and at the same time produce an initial guiding force which can be kept nearly constant, thus avoiding the high final lateral resistance which is found in a good many of the trailing trucks now in use.

In addition to the foregoing some work has been done in the way of producing a design by means of which the lateral play in locomotive driving wheels can be taken up without removing the wheels from under the engine or taking the boxes off from the axles. No doubt in the near future a practical device of this kind will be produced. This is another one of the many problems which can be worked out which will enable the railroads to keep their locomotives in service.

The advent some years ago of the power reverse gear overcame one of the great objections that engineers had to large locomotives. It is a fact that it is almost impossible for one man to reverse one of our large locomotives equipped with the ordinary hand reverse lever. Power reverse has come to be an essential part of engine equipment and has been found to be economical even though it may be used on a locomotive which could be comparatively easily reversed by hand.

Probably no one thing contributes more to the failure of side rods than the improper adjustment of shoes and wedges. If these are allowed to run loose, stresses in the side rods will amount to a very high figure and it is impossible to determine to what extent they may go. A satisfactory automatic wedge if properly applied and maintained will, no doubt, go a long way toward preventing side rod failures.

Means for Increasing Nominal Tractive Effort

All railroads have points on certain divisions where there is a critical grade or the necessity of starting a heavy load under adverse conditions. At such places increased tractive effort is required which is not needed elsewhere. We are therefore confronted with the problem of producing a device which can be set to work to increase the tractive effort of a locomotive to such an extent that the critical grade or the necessity for increased tractive effort to start a train under adverse conditions will be overcome, thus enabling the engine to take its full tonnage over the entire division. This device should be so made that it can be applied when necessary and thrown out when the additional tractive effort is not required. Designs have already been produced wherein an additional tractive effort of 8,000 or 10,000 lb. has been applied to the trailing trucks of large locomotives. There is also a possibility of applying such a device to the tender truck, thus availing ourselves of the adhesive weight of the tender to help boost the engine over the critical points in a division. There is always present a possible potential boiler capacity which can be brought out by the use of a variable exhaust or other device sufficient to obtain rapid combustion at slow speeds.

What has already been done along this line may be taken as a start in the right direction. A certain amount of development work must be done in order that these necessary improvements may be made to operate satisfactorily. These problems require the co-operation of the railroads to provide

the necessary means for trying out such devices which, after having been carefully considered, show that they have possibilities for the future use.

The question of ash pans is also one needing serious consideration. With the large increase in size of locomotives in many cases we have evidently lost sight of the importance of this necessity.

Lubrication

Lubrication is a subject which has received much attention and a great number of combinations and experiments have been made to determine the most satisfactory method. With our present high superheat the proper introduction of oil into the cylinders and valves of a locomotive is worth serious consideration.

It is common practice in European countries to provide a force-feed lubricator located very close to the cylinder. The ordinary method which they use in connecting up this lubricator is to provide a pipe to each end of the piston-valve steam chest. This oil supply opens directly over each end of the valve when it is in central position. In addition an oil pipe is supplied to the cylinder at its center. It is reported that by this method there is less carbonization of the oil than when it is fed into the steam pipes or into the center of the piston valve steam chest. Whether or not this is so the author has no means of proving, but it seems logical.

In order to increase the tonnage which a locomotive can haul it is just as vital to decrease the resistance as to increase the power. It is not an impossibility to provide roller bearings for passenger cars and there seems to be no reason why they cannot be used on freight cars. Of course, this would mean very radical changes in design and a gradual displacement of present equipment, but the reduction of rolling resistance and the better facilities for lubrication which would be provided would be sufficient in time to overcome the necessary expense. All this may seem rather far-fetched, but is at least worthy of consideration.

Conclusion

In summing up the situation, it may be said that the use of the superheater alone has increased the capacity of locomotives when compared with saturated engines of the same design to such an extent that no one would think of building a large locomotive for up-to-date railroad service without the application of superheat. This is one of the greatest strides that has been made in the construction of locomotives in the past few years. We must not content ourselves, however, with what has been done with this one device. The large locomotive of today has become a necessity and is here to stay. What we need to do now is to avail ourseles of the opportunities offered in the application of many of the labor-saving and capacity-increasing devices which have already been worked out and are giving satisfactory service and at the same time look forward to the possibilities of applying other devices which are yet in their infancy, but which have proven beyond doubt that they are well worth our consideration and are of sufficient importance to warrant their adoption. There are many improvements yet to be made in locomotives and it behooves the operating officials of railroads as well as the leading minds in locomotive operation and design to get together and to continue to produce locomotives which in the next 20 years will be as far ahead of our present engines as our present locomotives are ahead of the locomotives that were built 20 years ago. Without the capacity-increasing devices which have been mentioned the large locomotive of today would be impossible—it could not be operated satisfactorily. Our large engines are an absolute justification of these improvements. Further developments are ready at hand and in their use lie the possibilities of still more powerful and economical transportation units built to operate within our present limitations of clearance and permissible rail loads.

A Welfare Campaign Among Mexican Laborers in the Southwest

By F. M. Richardson

Railroad Secretary, Young Men's Christian Asso., Chicago

THE RAILROAD DEPARTMENT of the Young Men's Christian Association is now conducting a welfare campaign among track laborers on the Rio Grande and the Albuquerque divisions of the Atchison, Topeka & Santa Fe in New Mexico that possesses much of interest to railway officers. As Mexican labor predominates in this territory, it was essential that the man selected to conduct this work have a speaking knowledge of Spanish. Other qualifications considered essential were a sympathy with the aspirations of the Mexican laborer, a teachable and inquiring mind and a willingness to accept the hospitality of a lodging in the labor camps to be visited. S. L. Hernandez, a secretary experienced in mining camp work was selected.

Colloquial instruction in English, educational talks in Spanish and the distribution of carefully selected literature printed in Spanish are the three principal channels through which educational contacts have been made. This work has been done at visits to sections and construction camps.

A typical program for an evening spent at a section, with practically every man, woman and child assembled either in the section house or in the station waiting-room, is generally as follows: (1) A 20-min. musical program, using the phonograph; (2) an educational talk upon some subject of interest; (3) English instruction; (4) distribution of literature.

The musical records most in demand are band numbers. Mexican national airs and Mexican folk songs are largely used in these programs. The talk following the musical program gives opportunity for general instruction in Americanization, for a discussion of relations of fidelity to one's employer and many other topics related to the circumstances of their life and employment. Especially does the talk present an opportunity to promote a better international feeling by pointing out America's traditional policy in relation to neighbors as exemplified by Cuba and the Philippines.

Mr. Hernandez has been able to counsel the family on the problems confronting them in relation to the education of the children, upon thrift and why they should deposit their savings in banks. Unfortunately, the Mexican attaches the same suspicion to our American banks that he holds regarding the fidelity of those in old Mexico. Every problem in the range of personal and family problems seems to have been brought to him, each complicated by ignorance and yet each reflecting a desire for adjustment to the conditions that obtain on this side of the border. Articles in the better Spanish literature, published in Mexico and in the United States, are brought to their attention to substantiate this traditional attitude of America as opposed to statements in the incendiary literature that has reached them. When it is remembered that the unmarried men of these groups return by the hundreds to old Mexico as often as every six months for a short visit, this work cannot be without real significance in promoting a better international feeling among the people.

On cars in transit with labor parties to distant points, sometimes requiring a trip of several days' duration, a program similar to those for the section men's evenings is conducted at intervals when the car is at layover points or on sidings. The phonograph contributes much to the contentment of such a party. The literature is in demand on the part of the few who can read, while the talks are listened to attentively by all. These labor parties are made up mostly of immigrants from old Mexico. Instruction regarding how to live in America is eagerly received. Popular subjects are: How to Keep Healthy, Things to Eat, and How to Count.

Joseph H. Young

JOSEPH H. YOUNG, who becomes president of the Denver & Rio Grande on its reorganization and release from receivership, is one of that large majority of railway executives who have risen from the ranks. He entered railway service as an office boy when he was 18 years old, and had a varied experience in the traffic, operating and other departments of railways in different parts of the country before he attained to executive responsibilities. Nine years ago he became president of the Spokane, Portland & Seattle and other Hill lines in the northwest. In 1914 he became president of the Norfolk Southern. Under government control he was first federal manager of the Virginian and the Norfolk Southern and later senior assistant director of the division of operation of the Railroad Administration.

Mr. Young is thoroughly acquainted with the Denver & Rio Grande and the people in the territory it serves. He was born and grew up in Salt Lake City and at different times held traffic and operating positions on different railways in the territory of the Rio Grande, including the Rio Grande Western. The Denver & Rio Grande is, financially speaking, what is commonly called a "poor" railway. Mr. Young has had experience as an operating officer in both rich railways and poor railways. Besides being an experienced and able operating executive he has always shown unusual diplomacy and skill in dealing with questions arising between the railways and their employees, on the one hand, and the public on the other. All things considered, he is probably as well equipped as any man that could have been selected to deal with the problems that will confront the management of the Denver & Rio Grande for some years to come.

J. H. Young

Mr. Young was born January 17, 1864, at Salt Lake City, Utah, and was educated at the University of Utah. He entered railway service in 1882, as office boy and warehouseman on the Utah Central, at Sandy Station, Utah. He was later agent and operator at various stations and then bill clerk, at Salt Lake station, the same road. He was with the Union Pacific as ticket clerk and train agent at Ogden, Utah, from 1883 to 1886. From 1886 to 1889 he was traveling passenger agent of the Chicago & North Western and in 1889-91 was general agent of the Salt Lake & Eastern at Salt Lake City, and general superintendent of the Utah Central. From 1891 to August 1, 1902, he was superintendent of the Utah division of the Oregon Short Line. Mr. Young was general superintendent of the Rio Grande Western, now part of the Denver & Rio Grande, at Salt Lake City from August 1, 1902, to December 1, 1904. On the latter date he became general superintendent of the Colorado & Southern. On December 11, 1905, he was promoted to general manager of the same road. From May 1 to October 1, 1907, he was general superintendent of the St. Louis & San Francisco, and then served in a similar capacity with the Southern Pacific at San Francisco until May 1, 1910. In the latter year he was elected president of the Alaska Steamship Company, the Northwestern Steamship Company, Ltd., the Northwestern Commercial Company, the Northwestern Fisheries Company, and the North Coast Lighterage Company; and vice president of the Copper River & Northwestern. From May 15, 1912, to January, 1914, he was president of the Spokane, Portland & Seattle, the Oregon Trunk Railway, the Oregon Electric Railway, the United Railways, the Spokane & Inland Empire, the Pacific & Eastern and the Dalles, Portland & Astoria Navigation Company with office at Portland, Ore. He was elected president of the Norfolk Southern, with headquarters at Norfolk, Va., in May, 1914. He was appointed federal manager of the Virginian in May, 1918, and in addition federal manager of the Norfolk Southern in the following month. He became senior assistant director of operation of the Railroad Administration in January, 1919, and returned to the presidency of the Norfolk Southern on March 1, 1920.

Car Loading

WASHINGTON, D. C.

ANOTHER GAIN in the number of cars loaded with revenue freight indicating an improvement in general business conditions is shown in the weekly report of the Car Service Division of the American Railway Association for the week of April 16. The total was 703,896, a gain of 10,000 in a week and of 37,000 in two weeks. This is the largest total for a week, with one exception, since January 15, although still below the figure for the corresponding week of 1919, when the total was 706,012. It was greater than for the corresponding week of 1920, when the loading was reduced to 601,695 by the switchmen's strike. For the week of March 5 the loading was 712,822. There was an increase as compared with the previous week in all districts except the Southern, where there was a drop of 1,457 cars. The increase is mainly in coal, which showed a gain of over 7,000 cars for the week, and merchandise and miscellaneous freight which showed a gain of 1,633 cars. Merchandise and miscellaneous has been gaining steadily since the first of the year, while coal has been falling off about an equal amount, but for two weeks in April the coal movement has been increasing. There were small gains as compared with the previous week also in livestock, forest products and ore.

An improvement in the demand for cars is shown by reports received by the Car Service Division for the week ended April 15. The average number of surplus or idle freight cars for the week was 499,479, or a decrease of 7,948 as compared with the previous week when a new high record in the number of idle cars was shown. This reflects the increase in loading shown in the week's report of April 9.

This reduction in surplus was due entirely to an increase

in the demand for coal cars, the number of surplus coal cars being 252,010, or a decrease of 9,284 compared with the previous week. The number of idle box cars remained virtually unchanged, there being 176,805 on April 15 as compared with 176,916 on April 8.

Compared by districts, decreases in the number of surplus cars were shown in the Allegheny, Pocahontas, Southern, Central Western and Southwestern regions, while increases were reported in the Eastern and Northwestern.

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS; COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO FOR WEEK ENDED SATURDAY, APRIL 16, 1921

Districts:	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L.C.L.	Miscellaneous	Total revenue freight loaded: This year 1921	Corresponding year 1920	Corresponding year 1919	Received from connections: This year 1921	Corresponding year 1920	Corresponding year 1919
Eastern	1921	5,041	2,888	37,114	782	5,730	850	56,375	63,962	172,742	.....	.....	177,385	.....	.....
	1920	2,148	874	30,826	1,522	5,593	982	26,018	43,078	.....	111,041	169,935	.....	87,232	192,270
Allegheny	1921	2,370	3,159	41,710	2,447	2,264	948	42,631	46,786	142,315	.....	.....	94,988	.....	.....
	1920	1,070	1,819	38,786	3,044	2,053	2,594	25,752	34,964	.....	110,082	145,491	.....	54,967	114,775
Pocahonias	1921	137	76	17,202	57	1,398	23	2,645	6,221	27,759	.....	.....	13,334	.....	.....
	1920	108	59	18,756	597	1,635	286	178	8,589	.....	30,208	33,046	.....	13,790	18,186
Southern	1921	2,922	1,951	17,341	460	14,049	708	38,037	37,349	112,817	.....	.....	62,413	.....	.....
	1920	2,790	2,365	21,158	240	16,063	2,806	24,977	51,964	.....	122,363	112,286	.....	65,866	62,170
Northwestern	1921	7,869	6,609	3,751	406	14,326	1,011	27,668	29,695	91,335	.....	.....	39,063	.....	.....
	1920	7,749	4,732	8,040	951	20,452	2,800	19,760	34,679	.....	99,163	101,659	.....	36,648	46,970
Central Western	1921	10,050	9,890	14,362	115	4,085	903	30,090	30,141	99,636	.....	.....	42,820	.....	.....
	1920	5,902	6,094	14,378	312	4,081	2,316	18,886	31,188	.....	83,151	92,643	.....	28,890	53,014
Southwestern	1921	4,978	1,957	4,178	98	6,057	498	16,636	22,890	57,292	.....	.....	42,104	.....	.....
	1920	2,509	1,001	3,942	115	5,809	370	13,608	18,333	.....	45,687	50,952	.....	30,540	37,892
Total all roads	1921	33,367	26,530	135,658	4,365	47,909	4,941	214,082	237,044	703,896	.....	.....	472,107	.....	.....
	1920	22,276	16,944	135,886	6,781	55,680	12,154	129,173	222,795	.....	601,695	.....	.....	317,933	.....
	1919	37,066	28,154	144,563	.....	52,935	20,583	.....	422,711	.....	.....	706,012	.....	.....	525,277
Increase compared	1920	11,091	9,586	.....	.....	.....	.....	84,909	14,249	102,201	.....	.....	154,174	.....	.....
Decrease compared	1920	.....	.....	228	2,416	7,777	7,213	.....	.....	.....	.....	.....	.....	.....	.....
Increase compared	1919	.....	.....	.....	4,365	.....	.....	214,082	.....	.....	.....	.....	.....	.....	.....
Decrease compared	1919	3,699	1,624	8,905	.....	5,026	15,642	.....	185,667	2,116	.....	.....	53,170	.....	.....

L.C.L. merchandise loading figures for 1921 and 1920 are not comparable as some roads are not able to separate their L.C.L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

April 9	1921	33,415	25,339	128,044	4,835	47,806	4,787	212,142	237,351	693,719	801,559	711,282	460,523	560,040	530,396
April 2	1921	33,354	23,584	109,284	4,862	46,911	5,508	211,244	231,895	666,642	858,827	688,567	459,161	669,872	518,098
March 26	1921	32,960	24,339	122,189	5,179	49,516	6,480	211,028	236,161	687,852	900,386	713,275	479,635	696,447	557,736
March 19	1921	36,038	26,423	126,081	6,122	50,065	6,048	208,816	232,114	691,707	855,060	699,720	490,938	652,300	515,212

Suggests Solution for New England Railroad Problem

F. J. LISMAN, head of the investment house of F. J. Lisman & Co., New York, and recognized as a leading authority in matters of railway economics, has suggested to the Interstate Commerce Commission a plan for solving the pending argument as to the divisions or allowances to be given the New England roads, which solution he believes would probably have a better chance for adoption than some of the other plans which have thus far been suggested. Briefly, Mr. Lisman suggests that the New England roads and the lines doing business with them should keep an account of the earnings derived from business interchanged with New England and that a sum sufficient to equalize the net earnings of the New England roads with those of the trunk line carriers should be paid the New England lines monthly, the sum to be pro rated among the carriers in proportion to each line's New England business. He further suggests that the plan should be made effective for a period of, say, twelve or fifteen months and that the present New England divisions case be suspended until the information to be derived from the procedure in the suggestion will be available.

He has outlined the details of his plan in the following statement:

Suggested Solution to Keep New England Lines Out of Bankruptcy

The intent of the Transportation Act was to enable the railroads to earn 5½ per cent on the fair value of their property devoted to public service. Owing to unforeseeable conditions the theory of this Act has not worked out during the last seven months.

The value of the New England roads is included in trunk line territory; therefore, the New England railroads are certainly entitled to earn as much on their value as the trunk lines as a whole, and if they fail substantially in that, the deficit should be made good in some way.

The adjustment or rates and divisions is a very lengthy process and urgent help is needed. It is, therefore, suggested that all the railroads in trunk line territory should keep an accounting of all earnings derived from business interchanged with the New England railroads and should pro rata and in proportion to their earnings from this traffic (not exceeding, however, 12½ per cent of such gross earnings) pay over to the New England lines, a sum which will equalize the net earnings of the New England railroads. That is to say, if in any one month all the railroads in trunk line territory have had net earnings as a whole at the rate of 3½ per cent per annum of their value and if the deficiency of the New England roads below 3½ per cent during that month, should have been $1,000,000, then the lines in trunk line territory, out of their earnings, are to make good this difference pro rata. For instance, if the earnings of the Pennsylvania Railroad on business interchanged with the New England lines during that month should have been $1,000,000, which may have been 20 per cent of the total gross earnings on this interchange business earned by the lines West of the Hudson River, then the Pennsylvania Railroad should be required to pay this pro rata, that is up to $125,000, to the New England roads, or as much less as may be required.

As the three systems in what was formerly known as "Pocahontas Region" have been large beneficiaries from the rate increase granted to the trunk line group, which includes the valuation of the New England roads, they should also contribute their proportion of the deficiency of the New England railroads on business carried by them and destined for New England points. This tonnage which moves out by water from Hampton Roads aggregates between 7,000,000 and 10,000,000 tons annually.

The connecting lines now claim the New England roads are not administered as economically as they might be, nor their local rates sufficiently high. It is, of course, easy to see the mote in your brother's eye and ignore the beam in your own eye. These points will be brought out by the investigation proposed by Senator Cummins and need not be considered at this time.

If the above suggested division of earnings should be ordered for twelve to fifteen months, it would give time to investigate the matter of fair divisions because it would not be proper to make this plan a permanent one in view of the fact that such a division is somewhat communistic in its nature and does not offer sufficient incentive to the New England roads to get the most out of their property.

Bankruptcy of the New England roads would not in the least serve or increase the facilities to the New England public; it would further disturb confidence in railroad securities and in view of the large advances of the government to these railroads, it would undoubtedly bring forth much adverse comment in

Congress and elsewhere, on part of men not familiar with the past and present needs of the situation.

It is in his letter to the Interstate Commerce Commission that Mr. Lisman suggests the suspension of the New England divisions case. In that letter he urges the need of prompt action and further details the plan of keeping separate accounts on the business interchanged with the New England lines. Concerning the latter feature of the plan he says in his communication:

"(3) That the commission suggests or recommends to the carriers that they shall keep separate accounts not only of the earnings accruing from the business interchanged with New England lines, but also as near as possible of the expenses here incurred in connection with said traffic; that the carriers west of the Hudson River file with the New England carriers, and the New England carriers vice versa file with their western connections, etc., not more than 90 days after the close of each month a detailed report of the earnings and expenses incurred in connection with this interchange tonnage. If any carriers should feel that these accounts are not properly kept they shall endeavor to arrive with each other upon an understanding as to the proper method of keeping such accounts, and if they fail to come to an agreement within forty-five days after the question of improper accounting has been raised they should appeal to the commission with a request for a decision on the subject."

"The object of these suggestions is," the letter to the Commission says, "that the necessary material for a final decision on New England divisions will thus be gathered together in course of the next 12 months, and that in the meanwhile most of the details on which a final decision must necessarily be based will largely be threshed out between the carriers themselves. I am using in the first line of Suggestion 3 the words 'suggests or recommends' in preference to the word 'order' for the following reasons: Many of the carriers, especially those in C. F. A. territory, participate to a small extent only in the New England tonnage and therefore will not want to bother to keep cost accounts in connection with this business. I am referring to such roads for example as the Ann Arbor, the Detroit & Mackinac, etc., and possibly some of the more important companies who get only a short haul from this traffic."

"The costs of operation of the New England railroads," Mr. Lisman continues, "have risen much more owing to the high wages than those of all other railroads. This is due to the fact that wages constitute nearly the entire cost of the expensive terminal and switching service. With decreasing wages the costs on the New England railroads should contract correspondingly more rapidly than on the other lines."

Do Mill Defects Cause Transverse Fissures?

Study of These Rail Failures Points to Influence of Chance Mishaps in Particular Heats

By C. W. Baldridge
Assistant Engineer, Atchison, Topeka & Santa Fe, Chicago

DURING THE YEAR of 1920 there occurred on some of the American railways a seeming epidemic of broken rails due to transverse fissures. On January 1, 1920, the number of identified failures on one railway amounted to 39 rails and on March 12, 1921, the identified failures due to fissures on this road amounted to 199 with a dozen or more failed rails which are suspected of being transverse fissure failures on their way to the test department for positive identification. Most of these suspects are broken rails that became so rusted before inspection as to make their positive identification impossible without running them through the drop machine and testing them for further fissures. The remainder are rails showing cracks in the gage side of the head of the rail, indicating a transverse fissure, but not yet broken for inspection.

A study of these broken rails develops some interesting facts, the first one being that out of more than two hundred rails involved, only one, a rail rolled by the Colorado Fuel & Iron Company in August, 1904, is charged with being of Bessemer process steel, this being assumed because it does not bear the process mark, "OH" to indicate that it is of open-hearth process steel. Serious doubt is cast upon its being of Bessemer steel by the fact that the Colorado Fuel & Iron Company, which made the rail, commenced making open-hearth steel in 1903. But owing to the fact that both open-hearth and Bessemer furnaces were in operation, and ingots from all furnaces were worked in the same rolls, no process marks were added to the brand on the rails until the use of Bessemer steel for rail making was abandoned, in the latter part of 1908.

Other mills followed much the same practice. The dates of commencing the use of open-hearth steel for rails, and the times of adopting of a process mark are indicated in brief as follows:

The Carnegie Steel Company began the operation of its open-hearth plant at Bessemer in 1913, but had rolled some rails from open-hearth steel shipped from its Edgar Thompson plant since 1910. It does not use the process mark "OH" as part of the brand except on request, but uses a stamp "OH" along with the heat number.

The Cambria Steel Company began the manufacture of iron rails July 27, 1854, of Bessemer steel rails in 1867, from steel obtained from outside sources. It began the manufacture of Bessemer steel July 10, 1871, and the rolling of rails therefrom on July 12, 1871. It began manufacture of acid open-hearth steel rails in 1878 and of basic open-hearth steel rails in 1906. The distinguishing process mark "OH" was adopted at that time. The first rolling of Bessemer steel rails in the United States is reported to have occurred at North Chicago Rolling Mill, in 1865.

The Colorado Fuel & Iron Company first rolled "OH" steel rails in latter part of 1903, gradually increasing the "OH" tonnage until June, 1908, when the use of Bessemer steel for rail making was discontinued. There is no information as to process marks prior to latter part of 1908, but discontinuing of the use of Bessemer steel, the mark "OH" was added to brand. Previous to this the process mark could not be added to the brand, as both kinds of steel were passed through the same rolls.

The Lackawanna Steel Company began the manufacture of open-hearth steel rails on February 2, 1907. The open-hearth process mark was stamped on the rails until 1920, when "OH" was added to the brand.

The Tennessee Coal, Iron & Railroad Company com-

menced the manufacture of rail from open-hearth process steel in 1903, and adopted the process mark in 1906.

The Illinois Steel Company started rolling open-hearth steel at Gary Works, February 17, 1909, and "OH" was added to the brand at that time.

On one railway with which the writer is familiar, over ten thousand miles of Bessemer steel rails have been used, more than half of it having served the first cycle of its usefulness in main line track, with only one transverse fissure failure being charged against it, and that one case being seriously open to doubt.

About 400 miles of 85-lb. A.S.C.E. section rail of Bessemer process steel, or perhaps mixed processes are still in main line running track, and carrying the same axle loads, the same locomotives and same trains that are being carried by the 90-lb. open-hearth rails adjoining. Not a transverse fissure failure has been found in this Bessemer steel, while a considerable number of such failures have been found in the open-hearth steel adjoining.

Very few failures due to transverse fissure have been reported in Bessemer steel rails by other companies, and in view of the mixture of rails made from the two kinds of steel, before process marks were adopted, it is advisable that the heat number of every transverse fissure failed rail which is now charged to Bessemer steel be traced to prove if possible to which process the rail really belonged. If the tracing of the heats of the fissure failed rails now charged to the Bessemer process should prove them to be of open-hearth steel, it would practically prove that transverse fissures are due to some difference in the two processes, and even if these rails are of Bessemer steel, the very few of such failures in that process steel indicates that the failures are due to something which almost never happens in the Bessemer process and only occasionally happens in the open-hearth process.

Returning to a study of the fissure failures as quoted above, 23 identified transverse fissure failures have been found in one heat of steel, 6 of the 23 rails being "B" rails and 8 of them "G" rails. Another heat has developed 6 identified failures, all 6 of them occurring in "G" rails. Another heat has developed 13 identified fissure failures and 8 suspects; another heat recently inspected has a record of 6 identified fissure failures, 4 suspects, 2 mashed heads and 1 split head failures.

Another heat recently inspected showed 13 identified fissures and rail failure reports indicate 3 suspects not yet inspected; 4 of these identified being "C" rails, 3 "D" rails and 2 "B" rails. Another heat shows 5 identified fissures, 3 of them occurring in "C" rails.

The total identified fissure failures are divided among rails of letters as follows: A—19, B—32, C—46, D—24, E—26, F—22, G—25, H—1, and unknown 2.

The large number of failures occurring in an individual heat, and the number of failed rails of the same letter in the heat, indicates that transverse fissures are due to some defect which affects the heat as a unit. In this case transverse fissure failures have been found in only about one-half of one per cent of all the heats of open-hearth steel in use to date and in only one or in none of the Bessemer heats. It is, therefore, possible to trace back for the cause. The rails of heats which have not produced failures are carrying the same loads as are those which have produced failures. They are laid in the same manner, supported in the same manner, and were handled in the same manner from the mills to their present position in the track.

At the mills the rails of different heats were loaded alike, were gagged in the same gagging presses and in the same manner, were handled over the hot beds in the same way, and were rolled through the same rolls, in as near the same way as it is possible to roll them. Should any of these features be the cause of transverse fissure, the failures would naturally scatter indiscriminately through the entire output and not bunch up in a few heats.

In tracing back, the soaking pit is the first point where a difference of any consequence could occur, but here again the scarcity of fissure failures in Bessemer steel brings a verdict of acquittal. Therefore, the cause for the failures must lie still further back. The real point of difference between the two processes of steel making, as well as the difference between different heats made by the same process, must originate between the charging of the furnace and the teeming of the ingots, for the charging of the furnace is the beginning and the teeming of the ingots is the ending of the heat's existence as a unit.

A study and comparison of the two processes of steel making show several points of difference, a slight derangement of any one of which may be the cause of transverse fissure failures. In the open-hearth process, a larger amount of cold carbonizing reagent is added to the molten metal in the ladle, and usually with less agitation of the metal to insure thorough mixing, than occurs in the Bessemer process. Some heats in the open-hearth process require more "coking up," that is, the casting of bags of powdered coke and shoveling of lump coal, etc., into the ladle while the steel is running from the furnace, than do others.

It is possible that in one-half of one per cent of the heats, this is improperly done, or possibly over done, and brings about a defective state of the steel. Another possible source of trouble might be the addition of too much lime to the bath in the open-hearth furnace too shortly before the tapping of the furnace. However, the most probable cause is the frozen tap hole, which occurs occasionally in the open-hearth furnace and cannot occur in the Bessemer furnace.

The frozen tap hole delays for a time the removal of the heat of metal from the furnace, after it has reached the proper condition for removal, the length of time depending upon the means at hand for cutting the hole open. This delay results in burning out the carbon from the melt to a greater extent than was intended and usually results in heavier recarbonizing, or addition of spiegel, powdered coke, etc., in the ladle than would have been necessary had the tapping been accomplished without delay. It is true that a delay in pouring the heat of metal from a Bessemer converter might occur, due to some derangement of the plant, but such a delay occurs much less frequently than does the frozen tap hole in the open-hearth furnace.

It may be that none of the conditions mentioned is the cause of transverse fissures, but since only about one heat in two hundred is affected, there can be little doubt that the trouble can be easily remedied, or avoided, when it is know what to do, or what not to do, in the making of the steel. The indications are that the cause of transverse fissures in rails is connected with the furnace practice, therefore, the surest way of determining just what is the cause would probably be to have a careful log kept of every detail of the furnace practice of each heat, and when transverse fissure heats are located (which will usually be from 3 to 10 years after the manufacture of the rails), make a careful study and comparison of the details of the furnace practice of the good and bad heats.

Mrs. M. E. Wilber, a typist in the general office of the Southern Pacific at San Francisco, wrote during the year 1920 a total of 38,756 letters, spending in this work 2,165 hours. Mrs. Wilber's portrait is printed in the April number of the Southern Pacific Bulletin, and she is called the Mistress of the Keyboard. The year's record averages 143 letters per day of eight hours, and the total number of hours given seems to indicate that she worked about five and a half days a week for fifty weeks. It is estimated that the average number of lines in each letter written was seventeen.

Great Northern-Northern Pacific Bonds Approved

I. C. C. Authorizes New Joint Bonds and Also Additional Bonds for Collateral and Conversion

WASHINGTON, D. C.

THE PLAN proposed by the Great Northern and Northern Pacific railroads for refinancing their purchase of the stock of the Chicago, Burlington & Quincy by the issue of $230,000,000 of joint 15-year 6½ per cent convertible gold bonds secured by the Burlington stock and some additional collateral in the form of individual bonds of the two companies was approved by the Interstate Commerce Commission in a decision dated April 21 which was made public on April 25. The new joint bonds, which under the commission's order are to be sold at not less than 91½ per cent of par, are to refund the $215,000,000 of joint 4 per cent bonds issued 20 years ago to finance the Burlington purchase, which mature on July 1. Commissioners McChord and Eastman filed dissenting opinions opposing the plan as being unduly expensive. Commissioner Potter filed a concurring opinion answering their arguments and pointing out that the commission had prevented the carrying out of the plan proposed by the roads under which $80,000,000 of Burlington bonds would have been issued against improvements made out of income and used to retire a part of the joint bonds.

The application has attracted unusual interest because of the size of the financial transaction involved, as it represents the largest railroad bond issue ever made at one time.

The various steps in the refunding transaction as authorized were as follows:

Various Issues Authorized

The commission's order approves the proposed joint trust indenture of the Northern Pacific and the Great Northern, in the form submitted.

The Northern Pacific and the Great Northern are authorized (1) to issue $230,000,000 of their joint 15-year 6½ per cent convertible gold bonds under a proposed trust indenture to be executed and delivered under date of July 1, 1921, by them to the First National Bank of the City of New York as trustee.

The Northern Pacific is authorized (1) to issue nominally $33,000,000 of its 6 per cent refunding and improvement mortgage bonds, series B, under its mortgage dated July 1, 1914, to the Guaranty Trust Company of New York; and (2) to pledge the bonds as collateral under the proposed indenture; the bonds to be dated January 1, 1921, and to mature July 1, 2047.

The Great Northern is also authorized (1) to issue nominally $33,000,000 of its 7 per cent general mortgage gold bonds, Series A, under its proposed general gold bond mortgage, dated January 1, 1921, to the First National Bank of the City of New York; and (2) to pledge the bonds as collateral under the proposed indenture; the bonds to be dated July 1, 1921, and to mature July 1, 1936.

The Northern Pacific is authorized to issue at par and accrued interest, and from time to time upon payment or conversion of the joint bonds in accordance with the provisions of the indenture, its refunding and improvement mortgage bonds, series B, to an amount not exceeding $107,000,000 under its mortgage; the bonds to be similar to the $33,000,000 of bonds described to be used for purposes specified.

The Great Northern is also authorized to issue at par and accrued interest, and from time to time upon payment or conversion of the joint bonds in accordance with the provisions of said indenture, its general mortgage gold bonds, series A, to an amount not exceeding $107,000,000 under its proposed general gold bond mortgage; the bonds to be similar to the $33,000,000 of bonds above described and to be used solely for the purposes specified.

The proposed general gold bond mortgage of the Great Northern, in the form submitted, is approved.

The Great Northern is also authorized to pledge as collateral under its proposed general gold bond mortgage $12,132,000 of its first and refunding mortgage gold bonds, bearing interest at 4¼ per cent, dated May 1, 1911, maturing May 1, 1961, issued under its first and refunding gold bond mortgage, dated May 1, 1911, to the Bankers Trust Company, and now held unencumbered in its treasury.

The Great Northern is authorized to pledge as collateral under its proposed general gold bond mortgage, an additional $24,200,000 of its first and refunding mortgage gold bonds, subject to the existing pledge thereof with the Secretary of the Treasury as security for a loan under section 210 of the transportation act; said bonds being similar to the $12,132,000 of such bonds above described.

Following is an abstract of the report:

Report of the Commission

A hearing upon the application was had on April 11, 1921. At the hearing there were no appearances except in behalf of the applicants. No objection to the granting of the application has been offered by any authority of any State in which either applicant operates.

The application grows out of the necessity of paying or refunding $215,227,000 of 4 per cent joint and several bonds, in the hands of more than 18,500 holders, issued under date of July 1, 1901, in payment for 1,076,135 shares of the capital stock of the Chicago, Burlington & Quincy of the par value of $100 per share. They are secured solely by the pledge of 1,658,674 shares of that stock owned by the applicants. The applicants, lacking available funds with which to pay them, must issue and sell some form of securities sufficient in amount to raise substantially all of the required $215,227,000. For this purpose they have decided to issue the joint 6½s; and the uncontradicted evidence is that the issuance thereof is the best means now available for obtaining the necessary funds.

Conversion Privilege

The joint 6½s will be callable for redemption, as a whole or in amounts of not less than $5,000,000, on 75 days' notice at 103½ per cent of par and accrued interest. Each holder of joint 6½s, whether or not they be called for redemption, will be entitled to convert them at any time before maturity into a like amount of the Northern Pacific refunding and improvement mortgage bonds, and/or of the Great Northern general mortgage gold bonds. But this right of conversion into the mortgage bonds of either applicant will cease when $115,000,000 of its bonds, less an amount equal to one-half of the principal amount of joint 6½s redeemed, shall have been issued upon such conversion. Upon each conversion, except when made upon an interest date, accrued interest will be adjusted in cash. The evidence shows that the calling of joint 6½s for redemption would probably result in the conversion of the greater part of the bonds so called.

Many of the joint 4s are held by insurance companies, savings banks, trust companies, trustees and other similar investors. In several of the chief investment states bonds secured by stock collateral alone cannot now be lawfully purchased and held by such investors. It is believed, however, that the provision for conversion will not only enable the applicants to reach this market but will also insure the early substitution of mortgage bonds for a considerable portion of the joint 6½s without any calling of the latter for redemption.

Between July 1, 1914, and December 31, 1920, the Northern Pacific expended for additions and betterments properly chargeable to capital account $45,208,084, none of which has been capitalized. It now proposes to reimburse its treasury in part for these expenditures by drawing down on account thereof, under its refunding and improvement mortgage, $33,000,000 of series B bonds, and to pledge the same under the indenture. These bonds will be callable for redemption after July 1, 1936, on any interest date on three months' notice at 110 per cent of par and accrued interest.

The Northern Pacific mortgage reserves $222,400,000 of the bonds issuable thereunder for issuance from time to time for the purpose of purchasing, paying or retiring joint 4s before, at or after their maturity. Section 4 of the third article thereof provides that $1,000 of the bonds so reserved may be issued for each $500 of the pledged stock upon its release from pledge and deposit with the trustee thereunder. That company seeks authority to issue from time to time,

pursuant to this provision, its mortgage bonds to an aggregate amount of not more than $107,000,000.

The maximum interest rate permissible under the Great Northern first and refunding gold bond mortgage is 5 per cent. That company can not procure the issuance of bonds thereunder against deposits of the stock, unless it deposits a majority of the issued and outstanding shares. It does not own a majority of the shares. It therefore determined to execute and deliver under date of January 1, 1921, to the First National Bank of the City of New York its proposed general gold bond mortgage. Section 5 of the third article thereof provides for the issuance of $140,000,000 of series A bonds to be dated July 1, 1921, mature July 1, 1936, and bear interest at the rate of 7 per cent. These bonds will not be redeemable before maturity.

The Great Northern proposes to draw down under that section and to pledge under said indenture $33,000,000 of series A bonds. The remainder, $107,000,000 thereof, are reserved by that section for issue from time to time for the purpose of exchanging, redeeming, or retiring upon surrender for conversion, in accordance with the terms of the indenture, a like principal amount of the joint 6½s. Authority is sought to issue, from time to time, pursuant to this provision, series A bonds to an aggregate amount of not more than $107,000,000.

The proposed indenture provides that, upon any redemption of joint 6½s, the trustee shall release to each applicant in respect of each $1,000 of bonds so redeemed $100 of its pledged mortgage bonds and $385, par value, of the pledged stock. It also provides that, upon any surrender of joint 6½s for conversion into the mortgage bonds of either applicant, the trustee shall release to that applicant, for each $100 of bonds so surrendered and against delivery to the trustee of $100 of such applicant's mortgage bonds, $77, par value, of the pledged stock and $20 of its pledged mortgage bonds. Each redemption or conversion of joint 6½s will, therefore, result in a partial severance of the applicants' joint ownership of the stock.

There have been issued and are actually outstanding $35,668,000 of the Great Northern first and refunding mortgage gold bonds due May 1, 1961. There have been pledged with the Secretary of the Treasury $24,200,000 of similar bonds. It is desirable that this company's proposed general gold bond mortgage be a first lien on a majority of the bonds issued and outstanding under its first and refunding gold bond mortgage. Therefore, it proposes to close its first and refunding gold bond mortgage with $72,000,000 of bonds issued and outstanding thereunder, of which $35,668,000 will remain in the hands of the public. The balance, $36,332,000, will be pledged under the proposed general gold bond mortgage, which will provide for the pledge thereunder of $24,200,000 of such bonds, subject to the existing pledge thereof with the Secretary of the Treasury, and of an additional $12,132,000 thereof now held by the company unencumbered in its treasury.

Proposed Terms of Sale

The applicants propose to issue and sell the joint 6½s at some convenient time on or before July 1, 1921, through a contract to be made with a syndicate of bankers, who will agree to provide on or before that date the moneys needed to pay the joint 4s. No contract or commitment to this end has been made and none will be made without our approval. The applicants propose to sell the joint 6½s at the best prices obtainable at the time when their issue is authorized. They represent that it is not possible to obtain definite prices in advance of such authorization; but that the joint 6½s probably could not be sold to the public for more than 96½ per cent of par and accrued interest, and that the cost to the applicants of marketing the same, including a reasonable compensation to the syndicate and to the distributors, will be about 5 per cent. If the transaction should be consummated on this basis, the joint 6½s would be purchased by the syndicate at 91½ per cent of par and accrued interest and the discount thereon would cover the cost to the applicants of marketing the same. Were the joint 6½s to be sold to the syndicate at that price the effective rate of interest which the applicants would have to pay would be about 7.45 per cent. While this rate is very high the uncontradicted evidence is that the terms mentioned are the best which can be obtained at the present time.

If the proposed issue of bonds should net the applicants but 91½ per cent of par, it will be necessary for them to provide $4,777,000 in addition to the proceeds thereof in order to pay the joint 4s. This the evidence shows they will be able to do.

The proposed issue of joint 6½s will increase the fixed annual interest charges of each of the applicants by $3,170,460, provided that none of the bonds are converted. Assuming a conversion of half the issue into the 7 per cent bonds of the Great Northern and half into the 6 per cent bonds of the Northern Pacific the fixed annual interest charges would then be further increased by $575,000 in the case of the Great Northern and be correspondingly decreased by $575,000 in the case of the Northern Pacific. These figures do not reflect the additional cost to either applicant resulting from the sale of the joint 6½s at a discount.

We approve the applicants' proposed joint trust indenture and the proposed general mortgage of the Great Northern in the respective forms in which they have been submitted.

The applicants have had their joint 4s outstanding for nearly 20 years. During that time they have made good earnings but have not reduced the principal amount of this obligation. The interest thereon has been more than met currently by their dividends from the Burlington stock, to purchase which the joint 4s were issued. The near approach of maturity presents the alternative of default, or of such refinancing as now appears to be practicable. And the testimony is that an extension or refunding of the present loan for a short term would be of no material benefit to applicants. The situation presents an emergency and we must deal with that situation as it is.

Commissioner Potter Calls Plan Sound Financing

Commissioner Potter in his concurring opinion said in part:

It appears to me that there is reason to apprehend that the dissenting opinions of Commissioners McChord and Eastman may leave erroneous impressions regarding the views of the commissioners who concur in the majority report.

Undoubtedly the carrying out of the plan will be expensive. It should be pointed out, however, that the element of expense is due in substantial part to the fact that we declined to approve of the plan submitted to us on the application of the Burlington, and forced the utilization of the more expensive plan now submitted.

There is a suggestion of criticism because of the fact that the Great Northern and the Northern Pacific acquired the Burlington stock. I fail to see wherein we have license to criticise that transaction. Its merit is not involved in this case. There has been no inquiry regarding the propriety of it, and there is no record upon which fairly it could be criticised. It has stood unquestioned for 20 years, and for the purpose of this proceeding must be presumed by us to have been sound. Beyond this, the phenomenal record made by these three properties during the last 20 years, in fairness should be regarded as justifying the relation which existed between them. That relation seems to harmonize with the consolidation provisions of the Transportation Act and to indicate that those who were responsible for it were leaders about 20 years ahead of the leaders of the present day.

It is suggested that some sinking fund scheme should have been followed heretofore. A sufficient answer is that no such plan was adopted, and we must deal with conditions as we find them. It has not been pointed out how any sinking fund scheme would have been helpful. The carriers have not, during the last 20 years, disbursed any undue or disproportionate amounts in dividends. They have spent vast sums for additions and betterments which were needed in the public interest. Any sinking fund scheme which would have withdrawn earnings with which to retire the Burlington joint 4's would have served no purpose except to force the issuance of other securities with which to replace the monies which the sinking fund would have taken. Under the plans which universally have prevailed a large part of capital invested in railways has been represented by bonds. This has been in the public interest, and this method of financing undoubtedly will continue. The plan represents sound financing and has been forced by necessity as the best method. It would not have been and could not have been used if it were not supported by sound economic reasons. It is likely that when the Burlington joint 4's were put out the 20-year maturity was decided upon because it was believed that they could be refunded on a basis better than 4 per cent—which probably could have been done except for the World war.

The suggestion that an extension of two or three years should have been obtained has been answered by testimony that it is impossible to obtain such an extension. The intimation that a forced refunding on a 6 per cent basis should have been resorted to, suggests a policy of repudiation which should not be encouraged by us. In this country the investor has the right to choose the investments which he will make. When, as in this case, he is entitled under the contract which he holds to receive a definite amount at a certain time, he has the right to demand that amount in the medium which his contract provides. To force an investor to receive in payment of his debt another security worth only 80 or 90 cents on a dollar would represent a policy of dishonesty, which we, on behalf of the American public, have no right to enforce and approve.

The situation before us is relatively simple. The joint 4's must be met on July 1, 1921, if the credit of the applicants and railroads generally is to be preserved. The results of a denial of this application would be disastrous to the railroads and to the public. It probably would be impossible to put through any other plan by July 1. This application and the prior application by the Burlington have invited and urged our assistance for more than six months. The uncontradicted evidence is that the method proposed, despite its cost, is the best available and the only one the success of which is virtually assured.

Commissioners McChord and Eastman Dissent

Commissioner McChord, in a dissenting opinion, said in part:

The plan submitted is, in my judgment, so expensive and so at variance with the spirit and purpose of the amended act, and so foreign to the interests of the public and the carriers, that I am constrained to withhold my assent. Twenty years ago the northern lines jointly acquired approximately 97 per cent of the capital stock of the Burlington, and to obtain the funds issued their joint and several 4 per cent bonds collaterally secured by deposits of the capital stock so purchased. During that period the Burlington dividends have paid the interest upon the joint 4's, the northern lines have distributed dividends upon their own capital stock, and have expended various sums in maintenance, betterments and extensions; but nothing has been set aside as a sinking fund to retire any part of their bond issue, and at the end of the 20-year period they have failed to cancel a single dollar of the indebtedness incurred for the sole purpose of obtaining control of another trunk line. To postpone the day of reckoning they now propose a joint refunding issue of $230,000,000, initially increasing their outstanding obligation by approximately $15,000,000, to be floated in accordance with a plan which will net them about $210,000,000, after deducting the discount and underwriting costs. Thus, at the threshold, not only are they faced with an expenditure of approximately $20,000,000 to accomplish merely the flotation of the issue, but the net proceeds will fall almost $5,000,000 short of the principal sum necessary to meet and retire the outstanding joint 4's, and, as frankly admitted, this deficit must be "dug up" from other sources. This is not all; they are to assume a 15-year undertaking to pay an interest rate increased by more than 50 per cent per annum, which for that period will aggregate over $86,000,000 additional fixed charges, based upon a principal enlarged by nearly $15,000,000, and callable at 3½ per cent above par, equal to 12 per cent of par in excess of the initially available net. So, also, in the event the privilege of the conversion into the Northern Pacific 6's is exercised, within the prescribed limits, those bonds, although enjoying a lower interest rate, are callable after 15 years at a premium of 10 per cent of par.

The foregoing discloses the prodigality of the transaction, the cost of which must sooner or later be met by travelers and shippers or else impair by so much the resources of the applicants. Having been unable to abate a single dollar's worth of their outstanding joint 4's, there is scant hope that the northern lines will

be able to reduce the new and more burdensome undertaking or even recoup the initial sacrifice with which it is to be launched, and the approval by the majority includes no such requirement for the future. Certainly, the present progression is in the direction of disaster. This is not a matter of negotiating a loan with which to continue those lines as going concerns, but solely to enable them to retain control of the Burlington; and it can not be successfully contended that the present scheme is necessary to maintain this triple alliance as a transcontinental system, in view of our power to prescribe through routes and joint rates, and to provide for joint use of terminals upon appropriate terms.

I think we should limit our authorization to an issue of refunding bonds of the northern lines in an amount sufficient to retire the maturing issue, bearing interest at 6 per cent and secured by the joint mortgage and by the collateral now having a materially increased value, to be exchanged par for par by negotiation with the present bond-holders. An admissible alternative would be an appropriate extension or renewal of the present obligations for a further period of something like 2 or 3 years, even at 7 per cent, the present indications being that the interest rate has passed the peak and will then have declined to a reasonable figure; and before the expiration of that time steps could be taken to place refunding bonds in the hands of investors on less costly terms.

Commissioner Eastman said in part:

Applicants and their financial advisers, while no attempt has been made to communicate with any considerable number of the holders of the joint bonds, state that they have interviewed a few of the larger holders and find no disposition to accept 6 per cent bonds, however secured, in substitution for the maturing 4 per cent bonds. On the contrary, they doubt whether many of the holders will accept in exchange even the proposed new bonds on a 6⅞ per cent basis, and they believe that it will be necessary to pay cash in settlement in more than three-fourths of the cases. Their plans, therefore, contemplate the sale of most of the new bonds to new purchasers for cash, and it is testified that the cost to applicants of this marketing will be about $11,500,000.

Notwithstanding these statements, I cling to the belief that with our help and without employing brokers at the huge cost proposed, applicants could carry through this refunding operation upon much better terms. In this belief I rely, not upon altruism, but upon the enlightened self-interest of the holders of the joint 4's. Railroads generally are passing through a very trying period, and their welfare is vital to the welfare of the country. Friendly co-operation, such as I have in mind, on the part of the holders of maturing securities would not be an act of charity, but in the long run an act of selfish wisdom. If given the opportunity, I believe they would be quick to grasp the essentials of the situation and act accordingly. And such co-operation on their part would most assuredly react favorably both upon labor and upon the general public.

But we have the public interest to consider, and not merely the attitude or desires of the bondholders. The maturing joint 4's were originally issued to purchase the Burlington stock. The issue added nothing to the railroad property of the country, but had for its purpose only a shifting of control. To retain this control, applicants now propose to mortgage their own properties, invade the investment market with a new issue of $230,000,000 of bonds, and pay brokers $11,500,000 for selling these bonds to the public on a 6⅞ per cent basis. It seems to me that we should not, under existing critical conditions, permit railroad credit to be drawn upon in such a way and for such a purpose. It is admitted that many of the large holders of the maturing bonds, if paid in cash, will not now reinvest in railroad securities. The new bonds will, therefore, tap and be a heavy drain upon the present inadequate market for such securities, without adding in the slightest degree to railroad facilities. The same would have been true of the original plan for refunding with the help of Burlington bonds.

Reduced to simple terms the facts are that applicants did not pay cash for the Burlington stock in 1901, but gave for it their 20 year notes, secured by the stock as collateral. These notes are due next July, and it is claimed that the holders are unwilling to extend, even if offered a very large increase in interest rate. Applicants therefore desire to meet their obligations in cash, and they can undoubtedly do so if permitted to pay the price; but the transaction will place a heavy burden upon the country and will impair the market for railroad securities which are needed for much more vital purposes.

I therefore concur in the conclusions which Commissioner McChord has reached.

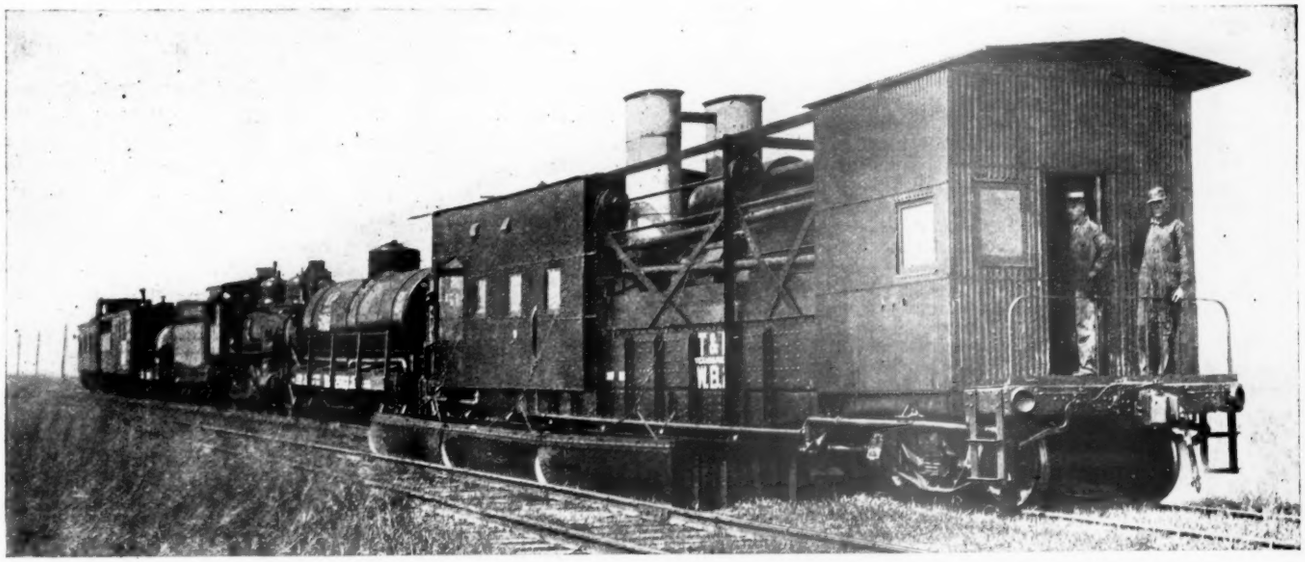
I feel confident, in view of prevailing railroad conditions, that these conclusions, if adopted by the commission, would meet with widespread approval, and that this approval would even be shared by the holders of the maturing bonds if the situation were made clear to them.

Southern Road Develops High Power Weed Burner

A NEW TYPE of weed burning apparatus was recently developed in the shops of the Texas & Pacific which is capable of destroying vegetation for a distance of 10 ft. each side the center of the track while operated at a speed of five miles per hour. In addition to the weed burner car itself, the full complement of equipment required for this work includes a locomotive, an oil tank car, a water car, a camp car for employees and a caboose. The total cost of destroying vegetation with this equipment is said to be less than $5 per mile, including the consumption of 60 gal. of fuel oil per mile by the locomotive and the weed burner.

The new weed burner was constructed on the principle of a direct application of heat at a temperature of 1,400 to 1,500 deg. F., and experience has developed that this may be done with safety. The heat is blown upon the vegetation beneath a hood 38 ft. long suspended over the track, giving a length of contact sufficient to destroy vegetation while the burner is moving five miles per hour.

The heat is developed by the efficient combustion of fuel oil, combined with the correct quantity of air applied by forced draft, the combustion taking place in a furnace lined with refractory materials. The temperature of the furnace gases is reduced to safe limits for application to the track by the further admixture of air in suitable quantities. A particularly complete arrangement has been worked out for the mechanical handling of dampers, wings, hoods, etc., so that



The Weed Burning Outfit Complete with Burner in the Foreground, Followed by Tank Cars, Locomotive, etc.

the process is thoroughly under the control of the operator. The apparatus is mounted on a steel underframe flat car lengthened to 60 ft. The machine is carefully designed to assure continuous operation at a low maintenance cost. Standard commercial equipment is used for parts subject to wear or breakage, thus minimizing expense and delay for repairs. The apparatus has proved successful in operation.

Farmers' Organizations Demand Rate Reduction

WASHINGTON, D. C.

THE DELEGATION of representatives of the National Farmers' Union and other agricultural organizations which have been in conference at Washington and which called on members of the Interstate Commerce Commission on April 20 to urge an immediate reduction of freight rates, took their appeal to President Harding on April 21. A memorial was presented pointing out the serious conditions faced by the agricultural industry and urging that immediate relief be given, but in the memorial no effort was made to place the entire blame for the situation upon freight rates and the President was urged to consider the agricultural and transportation problem as a part of the broad national question of economic readjustment. The memorial said in part:

"With frozen credits, with almost prohibitive freight rates and with costs of distribution so enormous, it is impossible for the farmer to market his products without incurring a loss. The consequence is that while millions of tons of food rot in the field or are held in the barns or in other places of storage, scores of thousands of our children in the cities are unable to obtain food sufficient to nourish their little bodies. The farmers are overwhelmed with debt. They are unable to buy necessary fertilizer. They cannot obtain needed credit and there are in hundreds of thousands of cases no markets open to them. The freight rates constitute a crushing burden on the farmer. We maintain that the rise in freight rates to heights hitherto undreamed at a time when their products were being marketed at figures far below the ten-year average price is crushing the life out of the industry and if continued will retard the development of that co-operative spirit among the great industries of the nation which must be fostered in order to bring about in an orderly manner the reconstruction of our disordered national life.

"It is true the railway executives complain that they are making no money and some of them fear that a reduction would mean ruin for the mammoth enterprises they are directing. There is no element in American industrial life would more regret the ruin of the great carrying industry than would the farmers. Therefore it is in no spirit of petty criticism that we approach this immense subject. Transportation is second only in importance to production. The one is dependent upon the other. The one gives life to the other.

"So it is in a spirit of friendliness to the railways that we make our appeal to you. The railways cannot continue to be wholesome without the assistance of agriculture. When farms are abandoned or production restricted railway securities must suffer impairment in value. We are here to offer to yourself and the railways the hearty, intelligent and enlightened co-operation of the tillers of the soil. Agrarian America cannot survive unless it is in constant contact with urban America and this contact is secured by the railways and other carrying agencies.

"But, Mr. President, to settle this problem and to settle it right, agriculture needs the co-operation of all basic industry. It is ready to take its place by the side of steel, oil, finance, coal, lumber, labor, the railway executives and other great agencies. But we want you to lead all."

The President was asked to call a conference of the heads of finance, the coal industry, the oil industry, the railway industry and labor, and especially the railway labor board, in order that they, in harmony with agriculture and under the leadership of the President, may work out a solution of the problem.

A committee report presented by S. W. Brookhart and adopted by the meeting was less conservative than the memorial. In attributing a large part of the losses of the farmer to the "unreasonable rise in railroad rates" the report declared that the rise in freight rates was caused by a "cost plus guaranty law," that the valuation used by the commission was too high and covered over five billion dollars of water, that the men who controlled the railroads controlled the price of steel and coal and it referred to the wage advance of last year as if it were the only one that had to be met by the increase in rates.

"A unified government regulation under the management of honest and competent men would reduce costs of transportation in vast amounts," the report said. "The railroads now have about 10 billions of capital at an average rate of 4½ per cent. Upon all of this they have a guarantee of 6 per cent. This means a bonus of 150 millions. Add to this the guarantee on capital above market value and there would be a saving of 450 millions on capital charge alone. Seven hundred millions could be saved on coal, steel, and other expenses when the power of the trusts is broken. The waste of competition could be reduced by over 400 millions. The capitalization of unearned increment at the rate of over 300 million dollars per year would be saved. These items make a grand total of nearly 2 billion dollars, most of which could be used in the reduction of rates with proper readjustment of wages. The farmers pay 56 per cent of the freight rates and have a just demand for this reduction."

The executive committee of the American Farm Bureau Federation, which has been holding a two-weeks' meeting in Washington, has formulated a legislative program calling for a repeal of the "guaranty section" of the Transportation Act and a reduction of freight rates.

Rates to Intermountain Territory Found Not Unreasonable

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION has issued a decision dismissing the complaint of the Intermediate Rate Association, a voluntary organization of shippers' organizations and state commissions in the intermountain territory, which had asked for graded rates to the intermountain territory lower than those to the Pacific Coast. The commission finds that the rates from points of origin east of the Rocky Mountains to the so-called intermountain territory are not unreasonable, unduly prejudicial or otherwise unlawful. The opinion by Chairman Clark points out that this case differs from previous cases in which rates from and to these territories were considered in that now the rates to the intermountain territory are not higher than to the coast and there is no contention that they should be higher. The question is as to whether the rates to intermountain territory should be lower than to the coast and, if so, to what extent. After outlining the history of the long-drawn-out controversy over transcontinental rates, the report points out that on March 15, 1918, all departures from the long and short haul rule in westbound transcontinental rates were removed under the commission's decisions, in which it was found that, due to conditions brought about by the war, water competition between the Atlantic and Pacific ports was no longer a compelling force, and it was held that the maintenance of lower commodity rates to the coast than to intermediate points unduly preferred the coast. The commission also expressed the view that rates in certain instances, at least, might be graded. These decisions required no change in the class rates as they were already lower to the intermediate points than to the coast.

In the spring of 1918, shortly after the revised rates referred to were established, intermountain shipping interests took up with the Railroad Administration the question of graded rates for all commodities; that is, lower rates to intermountain territory than to the coast. After hearing before the Chicago western district freight traffic committee in July, 1918, the matter was referred to a joint committee, composed

of the members of the San Francisco district freight traffic committee and the Portland district freight traffic committee, with directions to work out in detail and submit for consideration a complete system of graded rates. A plan of readjustment was prepared and agreed to by the members of the coast committee, and referred to the Chicago committee for consideration and transmission with recommendations to the director general's director of traffic. In the meantime, the director general and his director of traffic visited Spokane and indicated to its citizens that graded rates would be accorded intermountain territory. However, the Chicago committee failed to act on the coast committee plan and the director of traffic eventually took the matter out of its hands and referred it to the Interstate Commerce Commission under section 8 of the federal control act, with a request that it give him its recommendations. Apparently because of the prospects of an early return of the roads to their owners, the request was withdrawn, but finally, at the suggestion of the director of traffic, the matter was drawn to the commission's attention by the filing of the complaint in this case.

In terms, violations of sections 1, 2 and 3 of the act to regulate commerce were alleged; but the principal complaint was brought under section 3, namely that the Pacific coast is given unreasonable preference, and intermountain territory is subjected to undue prejudice and disadvantage, because the commodity rates are not graded so as to afford intermountain territory the full benefit of its location nearer the east. The class rates were satisfactory to complainant. They are graded and, except for recent general increases, have been in effect for a number of years.

At a hearing on the complaint in 1919 the coast committee plan had the almost unqualified support of the intermountain interests, and, the report says, if adopted, it would practically satisfy the complaint. The director general and the carrier corporations vigorously opposed its adoption and later appointed a committee of railroad traffic officials to propose a readjustment which they would be willing to make in case the commission should find undue prejudice against intermountain territory. Such a proposal was prepared and submitted to the commission late in December, 1919, and it was understood that this proposal, although submitted during federal control, was primarily on behalf of the carrier corporations and looked forward to the then prospective period of private control. The carriers contended that the present rates are not unduly prejudicial and their plan was presented for adoption only in the event that the present rates (which referred to the rates in effect prior to the 33⅓ per cent advance made last August) were found unlawful. It contemplated a complete readjustment of the class and commodity rates giving effect to the grading principle, but entailed the disruption of important commodity rate relationships as between eastern points of origin and the cancellation of many commodity rates which latter matters were beyond the scope of the proceeding.

The complainant asked an adjustment which entirely disregards water competition and based solely on distance and other transportation conditions. The coast committee plan also assumed the non-existence of rail and water competition for transcontinental traffic and the rates proposed were based on distance and other transportation conditions. The eastern groups were retained, but the intermountain blanket was broken up and all rates were based on a first-class rate of $4.00 from the Atlantic seaboard to the Pacific coast. Plans based on this with some modifications were also presented by the Utah and by the Idaho interests. The various plans and the positions taken by various groups of shippers are discussed in the report, after which the conclusions are stated in part as follows:

Complainant's allegations with respect to the propriety of the present commodity rates have not been sustained. Speaking of these rates, as a whole, no undue prejudice to intermountain territory appears, and we can not say that the rates should be graded. Conditions warrant the carriers, in their discretion, in continuing the present blanket adjustment on many and perhaps most of the commodities that move in considerable volume. The ships that now ply between the Atlantic and Pacific ports are not nearly so numerous and the tonnage now moving is not nearly so heavy as during the period that followed the opening of the canal and preceded our entry into the war, but it is, nevertheless, certain that there is now sufficient transportation by water and ample indication that it will further develop and increase, to warrant the belief that within a comparatively short time it will reach a point where it will be felt in a serious loss of tonnage by the rail lines unless they have available appropriate measures to meet the situation. There is not that strife and rivalry that formerly characterized the coexistence of these two modes of transportation to and from the Pacific coast, but as between these separate sets of carriers there is that natural and well-grounded fear of each other's ascendency and power, sufficient, especially in view of the existing movement by water, to warrant a finding that there is actual competition at the present time. Energetic business competitors in their struggle for success always look beyond the present and are justified in keeping themselves fortified against each other's activities, even before the situation becomes serious. It is mainly for these reasons that the commodity rates have been held to their present level and largely for these reasons that the carriers are now opposing a disturbance of the present adjustment. Moreover, it was for these reasons, and in the interest of rate stability, that the suggestions as to grading made in our report in *Transcontinental Rates, supra,* were not couched in more positive and forceful language. There is less reason now than then for grading. We are not now prepared to say that the rail carriers can well be put in a position to lose or to risk losing a considerable portion of their present and prospective traffic to and from the coast by having their rates increased in order that there may be a differenial in favor of intermountain territory. An increase to the coast would be necessary unless we found the present rates to be not less than reasonable maxima. On this record we can not say that this is so. Moreover, rates for long hauls, particularly on low-grade traffic, are often blanketed over extensive territories, and even if the rates to the coast were found to be reasonable maximum rates it would not necessarily follow that all of them should be graded. In view of the special conditions under which these commodity rates were established and have been maintained, we can not fairly, unless we find them to be reasonable maximum rates, spread their effects farther into the interior. It is understood, of course, that these findings apply to the general rate structure. A somewhat different conclusion might be reached with respect to a specific commodity rate constituting an exception to the general adjustment. The fact that rates from certain interior eastern points of origin to the Pacific coast are lower than from the Atlantic seaboard is discussed in the record although not definitely brought in issue by the pleadings. This grouping of eastern points of origin applies to the intermountain territory as well as to the Pacific coast terminals. The grouping is not a source of injury to complainant. It reflects an adjustment of long standing.

Methods of rate making based upon theories that are no longer tenable or upon conditions that no longer exist should be discarded. When distances are relatively great, and when transfer at rate-breaking points is not attended by unusual costs, the combination basis, using local rates, ordinarily is abnormal and unscientific and often discriminatory. The railroads should be regarded more and more as one national system, and the time may not be far distant when we should proceed to the establishment of joint through class and commodity rates, lower than the combinations of locals, between practically all points in the country. We have generally recognized that through rates should be less than the combinations, but prompted chiefly by considerations of paramount public interest, growing out of the revenue conditions of certain carriers, we have refrained from and even declined absolute condemnation of combinations. We are now vested with specific authority to initiate rates that will protect revenues, and where carriers will suffer depletion of revenue by reason of the establishment of new joint rates, appropriate measures can be taken for their protection. We are not, however, prepared to now require the joint through rates here prayed for.

Since the record in this case was made up many and far-reaching changes in economic and transportation conditions have occurred. Conditions are unsettled. The future of transportation by rail and by water is uncertain. The suggested comprehensive plans for readjusting all of the rates over this large territory and the evidence submitted for and against each plan tread far outside the limits of the complaint. We deemed it advisable to hear what the parties desired to submit regarding a possible readjustment that would do justice to all. We have discussed some of those matters rather fully in this report. The record and

the discussion should be helpful in paving the way for a final settlement of this vexed situation. The extent of the territory that would be affected by a readjustment of all of these rates is indicated by the interests for which appearances are shown. Their interests are diverse and their contentions are often diametrically opposed. These questions can not be settled justly by accepting the views of those on either extreme.

Labor Board Rules A. B. & A. Wage Cut Illegal

THE ACTION of the receiver of the Atlanta, Birmingham & Atlantic in reducing the wages of its employees, in compliance with a ruling by Federal Judge S. H. Sibley recently, is in direct violation of the Transportation Act, according to a decision of the Railroad Labor Board announced on April 21. The Board, however, declared that "there is nothing to be gained at the moment by requesting the court to recall its wage reduction order and to direct a reinstatement of the former employees" and suggested that the employees, most of whom are on strike, hold conferences with the receiver and if an agreement is not reached, bring the case again before the Board. The decision also criticised the employees for striking instead of referring the wage dispute to the Board.

This case, the progress of which has been described in the *Railway Age* of February 4 (page 319), February 11 (page 367), February 18 (page 412), February 25 (page 454), March 4 (page 520), March 11 (page 548), and March 18 (page 724), has attracted a great deal of interest as the first case which has brought forth a clash between the Labor Board and a federal court and as the first legal tangle which the Board has been called upon to unravel.

After outlining the history of the controversy and the positions taken by the contending sides in the hearings held before the Board, the decision analyzed the stand taken by the carrier in opposition to the charge of violation. The receiver, in defending his position contended that: (1) he was not a party to Decision No. 2 and therefore not bound thereby; (2) he acted only under the orders of a federal court; (3) the Labor Board had decided that it was without jurisdiction in the case; (4) the Board's refusal to consider the carrier's financial ability to pay was not consistent with the Constitution in that it would deprive a carrier of its property without due process of law; (5) the Atlanta, Birmingham & Atlantic was not a party to Decision No. 2; and (6) the Labor Board being without jurisdiction the federal court had a right to fix just and reasonable wages.

Referring to the first two of these contentions, the decision termed them "insufficient" saying:

> Assuming that the Atlanta, Birmingham & Atlantic was a party to Decision No. 2, it is believed to be clear that this receiver is also bound. The appointment of a receiver does not alter the status of a property. It effects remedies and does not change the rights or obligations of the carriers. Among the obligations resting on a carrier is to carry goods and passengers at the rates approved by the Interstate Commerce Commission; to pay the engine and train service employees according to the basis of pay set by the Adamson Act; and to conduct transportation pursuant to the Hours of Service Act and numerous other Federal Acts enacted by Congress for the regulation of carriers. The appointment of a receiver by a federal court does not and cannot warrant the operation of the property by him free of these obligations.
>
> But it is urged that the act of the receiver in reducing wages was authorized by the District Judge. In the opinion of the Labor Board and with all respect to the learned judge who approved the order, the said order was beyond the jurisdiction of the District Court. Under Title III of the Transportation Act, 1920, Sections 301 and 307, the duty of determining just and reasonable wages upon a dispute duly referred, is imposed upon the Labor Board.

Referring to the third contention of the receiver, the Board denied that it had ruled it was without jurisdiction in the case saying:

> The Labor Board found that Section 301 had not been complied with, and it required the parties to comply therewith as was its duty under the law.

The fourth contention of the receiver was called "unsound" in the decision which said in this connection:

> It is difficult to see how a requirement that the conference should be on the justness and reasonableness of the then wages should amount to a taking of the carrier's property without due process. It was contemplated that the parties might agree at least in part, if they so conferred. It appeared that all prior conferences concerned themselves only with the ability of the carrier to pay, which is certainly not the only factor to be considered. If the conference had decided nothing, the dispute could have been referred to this Board for decision pursuant to law, and if the receiver had paid the wages according to Decision No. 2 for the brief period necessary for this Board to consider and decide the matter, it is very probable that the property would have been less reduced than by the course adopted. Furthermore, by this procedure the law would have been complied with.

The fifth contention was categorically denied, the Board stating that the carrier was a party to conferences held at Washington, March 10 to April 1, 1920, at which the just and reasonable wages were discussed.

In closing its finding the Board said in part:

> It is believed to be important to state again that in the opinion of this Board Title III required that in conferences on wage disputes the question should be what shall constitute just and reasonable wages. Throughout the conferences in this case the sole question discussed was the inability of the carrier to pay.
>
> Not until February 14 did the representatives of the carrier claim that the wages were not just and reasonable. Then for the first time did the carrier maintain that a decline had taken place in the cost of living. This claim laid the foundation for the valid dispute, over which the Board could take jurisdiction provided an attempt had first been made to settle the differences in conference. Such a conference the Labor Board in Decision 89 directed the parties to hold. The employees endeavored to comply with the direction; the receiver refused immediately putting into effect the wage reduction. This action on the part of the receiver the Labor Board regards as a violation of Decision No. 2.
>
> The Labor Board finds also that the receiver in reducing wages by authority of the Court instead of referring the dispute to the Board, has proceeded contrary to the letter and spirit of the Transportation Act.
>
> The Board believes that the exigencies of the case, and a misunderstanding of Decision No. 89, led the court into an error in assuming jurisdiction and authorizing the receiver to reduce wages instead of directing the receiver to comply with Decision No. 89. The action of the Court is regrettable since it has resulted in a strike, injurious alike to the Atlanta, Birmingham & Atlantic, its employees, and the region served by it, in which situation the Labor Board is powerless to act effectively so long as the Court differs from the Labor Board in its interpretation of the Transportation Act, 1920.
>
> Assuming the correctness of the Labor Board's conclusion that the receiver was subject to the Board's jurisdiction and that he violated the Transportation Act in reducing wages there remains the question whether the petitioners also violated the Act.
>
> While the Labor Board appreciates the provocation to which the employees were subjected by reason of the receiver's action, nevertheless, the Board cannot condone what in itself was a wrongful act on the part of the employees. It was their duty, on learning that the receiver would not join in referring the dispute to the Labor Board, but insisted in putting the wage order into effect, to themselves refer the wage dispute to this Board.
>
> The complication resulting from the strike and the replacement of former employees by others now working at a reduced rate, are such that the Labor Board believes there is nothing to be gained at the moment by requesting the Court to recall its order of February 28, and to direct a re-instatement of the former employees. It does, however, request that the Court direct the receiver to confer with the petitioners upon the question as to what constitutes a just and reasonable wage for the employees on the railroad, taking into consideration all factors set forth in Section 307 of the Transportation Act, 1920, and upon other questions involved, and in case of disagreement, to submit the dispute to this Board for decision.
>
> The Labor Board also requests the petitioners to attempt again to confer with the receiver regarding the justness and reasonableness of the wages and in case of failure to agree to submit the dispute to this Board for decision.
>
> However, as the United States District Court of the Northern District of Georgia, Northern Division, is exercising jurisdiction in regard to the matter of wages for the employees, it is decided by the Labor Board that in order to prevent a conflict in jurisdiction, it will take no further action in the matter until the Court shall approve or deny this Board's requests herein.

Rational Electrification of Steam Railroads

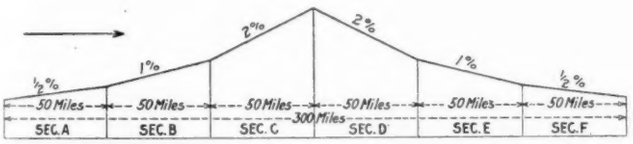
Method for Determining What Values of Profile and Traffic Density Make Electric Operation Desirable

By George R. Henderson

THE FINANCIAL CONDITION of the railroads in this country makes every economical suggestion of more than usual interest, and especially is this true of electrification, although the expense of installation at this time is, in many cases, prohibitive. A few years ago mechanical engineers received the unlimited claims of the electricians with considerable skepticism, but since a number of roads have electrified sections of their line and more rational claims are now in order, the subject has become one of importance to all the large roads.

A few weeks ago, at the Franklin Institute in Philadelphia, A. H. Armstrong of the General Electric Company gave a most interesting lecture on this subject, presenting facts and figures which had been obtained largely from the Chicago, Milwaukee & St. Paul line in Montana, of which 440 miles have recently been electrified. As this represents main line operation in a mountainous country, the results are of more general interest than those of local applications, such as the New York Central and the Pennsylvania in the vicinity of large cities.

Mr. Armstrong's claims were moderate and entirely free from the "cure-all" type which did more harm than good a few years ago. The important matters of repairs, inspection, turn-arounds, hostling, etc., were presented so forcibly that the writer considered it would be of interest to compare the costs of steam and electric operation over a hypothetical mountain division and to discover what importance the cost of coal assumes in the discussion. As present figures for material and labor are considered abnormal, pre-war prices were assumed, such as those prevalent a dozen years back. A division of 300 miles in length, with 50 miles each of ½ per cent, 1 per cent and 2 per cent up and down grades was used as a basis of calculations, and is shown in profile by the sketch. Roundhouses for steam locomotives are located at each end of the profile and at points 100 miles from each end. Locomotives may be considered as the Railroad Administration standard Mikado (2-8-2) type with the following characteristics:



Theoretical Profile Used as Basis of Calculation

Tractive force	60,000 lb.
Adhesive weight	240,000 lb.
Weight engine and tender	500,000 lb.
Heating surface (water)	4,285 sq. ft.
Superheater surface	990 sq. ft.
Grate area	70 sq. ft.

A train of 63 cars of 50 tons total weight each, or 3,150 tons for the load back of the tender, will require one engine for Sec. A, two for Sec. B, three for Sec. C and one for D, E and F down hill, the train being considered as operating in the direction of the arrow. The helper engines would start from the intermediate roundhouses, and in order to operate return trains would make 200 miles and 100 miles, respectively, for 300 miles of through train, one engine being used as a pusher over sections B and C. We may consider the level resistance as 5 lb. per ton, so that the total train resistance may be taken as 15 lb. per ton for Sec. A, 25 lb. per ton for Sec. B, 45 for Sec. C, —35 for Sec. D, —15 for Sec. E and —5 lb. per ton for Sec. F, the minus sign indicating the effect of gravity to push the train ahead on the descending portions of the run. For the type of locomotive indicated above we, therefore, find the following conditions:

Sec.	Locomotive	Total train weight	Total resistance	Ratio to trac. force, per cent	Speed upgrade
A	1	3,400 T.	51,000 lb.	85	15 m. p. h.
B	2	3,650 T.	91,000 lb.	76	17 m. p. h.
C	3	3,900 T.	175,000 lb.	97	10 m. p. h.

Down hill a speed of 20 m.p.h. may be attained, and perhaps 30 m.p.h. permitted on Sec. F. These speeds, with two hours allowance for changing engines, water stops, etc., would indicate a total of 20 hours over the 300 miles. Transportation delays, of course, would often increase this time.

The amount of coal has been estimated at 3½ lb. per horsepower-hour, which corresponds with 100 lb. per square foot of grate per hour for sections A and B, and 4 lb. per horsepower-hour for Sec. C. Downhill ¼-ton of coal per hour has been assumed. This gives coal used as

Sec. A	12 tons burned in 3 hrs. 20 min.
Sec. B	20 tons burned in 3 hrs. 0 min.
Sec. C	45 tons burned in 5 hrs. 0 min.

Down hill movement would use about 4 tons. The cost of coal varies greatly, especially at this writing, but some years ago $2 would represent a fair price per ton. The cost of pumping and treating water is likewise variable, but 25 cents per 1,000 gal. may be assumed, and as roughly one pound of coal will evaporate one gallon of water, we may charge water costs at 50 cents per ton of coal.

Repairs constitute another variable, but 20 cents per engine mile would probably represent pre-war figures for a locomotive of this size.

The pay of enginemen (engineer and fireman) will be covered at the rate of 8 cents per mile, that is, $5 for engineer and $3 for fireman per 100 miles.

The cost of handling at terminals, including hostling, turning, wiping, inspecting, etc., will be taken at $1.50 per engine, and these various figures will be compared with estimated costs of electric operation. The coal consumed at terminals is not included, but would be considerable—on the other hand, the power plant for generating the electric current must be kept constantly in operation, and a loss of some fuel must here be apparent.

The comparative costs for electric operation will consist largely in fuel and operating methods. For the locomotives we may consider a total of 12 pairs of drivers with 60,000 lb. on each, and four truck wheels with 45,000 lb. on each, a total of 900,000 lb. or 450 tons, and with train of 3,150 tons we have a total of 3,600 tons. Whether satisfactory results could be obtained by using this tractive force of 180,000 lb. at the head of the train would depend upon the construction of the cars placed in this service, and it might be necessary to have one unit at the head and another at the rear of the train to prevent destruction to draft rigging and center sills. If the latter course were necessary two engine crews would be needed, whereas one crew (of two men) could operate both units at the head of train by multiple control.

The question of fuel will also depend upon the possibility

of using regeneration, which means that there must be an ascending train at the same time that one is descending the grade, and this may not always be possible of arrangement. If the power house is steam operated, a kilowatt hour could readily be produced at the switchboard by the combustion of 2½ lb. of coal, and if 25 per cent loss be allowed from switchboard to rims of drivers, we will have a total coal consumption of 2½ lb. per horsepower-hour.

The train need not be broken (except for the possible shifting to the rear unit in passing over the heavy grades), as the electric locomotives can run 300 miles without difficulty, whereas we have considered that the steam locomotives would have to lay over each 100 miles of upgrade. This will reduce the terminal expenses, as repairs are generally found to be less than for steam locomotives; they are taken at one-half the amount, or 10 cents per mile for each of the two units. If the road was constructed as an electric line the intermediate roundhouses, with the coal, ash and water arrangements, shops, etc., could be eliminated, thereby saving considerable initial expense.

Electric locomotives operate satisfactorily on inspections made every 3,000 miles, and while they are much more expensive to build than steam locomotives, the fact that a greater car mileage can be gotten from them under ordinary conditions puts the initial cost of locomotives at about the same figure. The alternating current locomotive runs at a nearly constant speed, regardless of the load, so that we may assume 15 miles per hour throughout, or 20 hours to pass over 300 miles.

In the subjoined table two columns are provided for the electric operation, the first considering that regeneration is not possible and that one unit of power must push over the 2 per cent grade; the second utilizes the force of gravity of the descending train to assist those ascending, and virtually to put coal back into the bunkers; also considers that one engine crew only is needed by putting all the power at the head of the train. By calculating the horsepower needed to operate the 3,600-ton train, we find the fuel required as follows:

Sec.	Horse power required	Fuel required
A	2,160	9.5 tons
B	3,600	16.0 tons
C	6,500	28.0 tons
D	—5,000	—20.0 tons
E	—2,166	—8.5 tons

The minus signs are the credits to be allowed where regeneration is possible, and would reduce the coal requirements from 53.5 tons to 25 tons. These various values may now be tabulated for comparison, remembering that the second electric column includes regeneration and multiple unit control.

	Steam	Electric 1	Electric 2
Cost of coal per trip, at $2	$162.00	$107.00	$50.00
Cost of water per trip, at $0.50	40.00	.....	.....
Cost of repairs per trip	120.00	60.00	60.00
Cost of handling	9.00	1.00	1.00
Pay of enginemen	48.00	32.00	24.00
Total per trip	379.00	200.00	135.00
Cost per train mile	1.26	0.67	0.45
Saving per train mile	.....	0.59	0.81

Items such as train crew, car repairs, etc., which would be the same in both cases, have been omitted. It is evident from this table that the economies of electric operation should be considerable and must depend largely upon the original cost and fixed charges, as well as the traffic conditions of the section.

From the statements of Mr. Armstrong, the pre-war costs would have been something like $30,000 per mile of road for electrification, and in order to save 10 per cent of this there would have to be earned $3,000 a year over steam operation. By the first column of electric operation there would be a saving of 59 cents per train mile, which would require over 5,000 trains a year, or seven trains a day in each direction of 63 cars each, a total of 882 cars to pass over the division in each 24 hours; if the traffic did not approach this figure, electrification could hardly be considered.

Then a variation in the cost of fuel might change the conditions enormously so that the saving would be greater or less than expected. If water power were available the cost of electric operation would be much more stable, but, in any event, each case would be a problem of its own and a careful study of all the conditions involved would be necessary to estimate the probable economic advantages which might be obtained. The above is a hypothetical case to show some of the possibilities of rational electrification.

Safety First on the Chicago & North Western

THE SAFETY RECORD of the Chicago & North Western for the 10½ years ending with 1920, just issued, by R. C. Richards, chairman of the central safety committee, in Bulletin No. 53, again shows the remarkable results accomplished on that road. For the years 1912 to 1920, inclusive, the members of the Safety Committees made 50,029 recommendations for the elimination of dangerous conditions and practices; and all but four per cent of them were adopted and put into effect. Comparing these years (10 years 6 months), with 10½ years ending June 30, 1910, before the safety committees were organized, the bulletin shows the following large reductions (although the number of employees, the business and the mileage of the company have largely increased):

417 fewer employees killed, a decrease of 37 per cent.
22,600 fewer employees injured, a decrease of 24.7 per cent.
4 fewer passengers killed, a decrease of 3.5 per cent.
2,003 fewer passengers injured, a decrease of 20.4 per cent.
629 fewer outsiders killed, a decrease of 25.3 per cent.
330 fewer outsiders injured, a decrease of 5.1 per cent.

Colored diagrams are given which show what very large percentages of casualties to employees are due to dangerous practices on the part of the employees themselves.

In closing, the Bulletin says:

"This company will appreciate, carefully consider and adopt, if practicable, any suggestion or recommendation from its employees, patrons or neighbors which will make its operation safer, more regular and more satisfactory to the public.

" 'And the end is that the workman shall live to enjoy the fruits of his labor; that his mother shall have the comfort of his arm in her age; that his wife shall not be untimely a widow; that his children shall have a father, and that cripples and helpless wrecks who were once strong men shall not longer be a by-product of industry.' "

On the South Eastern & Chatham, England, Twenty-Five Years Ago

U. S. Chamber of Commerce Discusses Railroads

Report of Committee on Railroads Presented to Group Session at Atlantic City Annual Meeting

IN THE ANNUAL report of the Committee on Railroads of the Chamber of Commerce of the United States, which was presented to the Chamber at its convention at Atlantic City, N. J., on April 27, emphasis was laid on the necessity for reductions in railroad operating costs, particularly with reference to wages. After reviewing briefly the important railroad history for the past year, the report, in calling attention to the necessity for greater economy, pointed out that the increased gross revenues which will come to the railroads with reviving business conditions will not in all probability be sufficient to offset the present operating expenses. Increased co-operation of the carriers with each other in the performance of their services, particularly in the organization and management of terminals, was also advanced as one method of securing more efficient operation. Considerable importance was attached to the present state of railway credit and to the various plans for railway consolidations.

This report was read at a meeting of the railroad group of the convention on Wednesday, and the reading was followed by a discussion. The subject of the discussion was "What can be done to reduce cost and increase efficiency of railroad transportation?" The principal speakers were E. J. McVann, secretary of the Smokeless Coal Operators of West Virginia, representing the shippers, and F. A. Molitor of the Institute of Consulting Engineers, New York, representing the engineering profession. It had been planned to have a speaker representing the railroad executives and one representing the banking interests, but this part of the program could not be carried out.

The Committee's Report

The meeting of the railroad group was presided over by George A. Post, chairman of the Railroad Committee and president of the Hudson River Bridge Corporation, New York. The report was read by Richard Waterman, secretary of the Railroad Committee. Other members of the committee are: W. S. Dickey, Kansas City, Mo.; F. C. Dillard, Sherman, Tex.; E. J. Frost, Boston, Mass.; E. R. Johnson, Philadelphia; Charles E. Lee, New York; W. L. Salmon, Rochester, N. Y.; G. W. Simmons, St. Louis, Mo.; A. W. Smith, Atlanta, Ga., and Harry A. Wheeler, Chicago. An abstract of the report follows in part:

The railroads together with the other industries of the country are passing through a period of readjustment. The effect of the business depression which began about October last will appear from the following facts of record:

That the March traffic (in cars loaded) was about 13 per cent lower than in the corresponding month of 1920, and 18 per cent below the rather high average of March, 1918. Normally there is, of course, an annual traffic decrease from the fall peak to mid-winter. But in February, 1921, the earnings were 36 per cent below the previous October peak (the high record) as compared with a drop of 30 per cent between the 1918 peak (August) and February, 1919. The total car loading January to April, 1921, was about 15 per cent less than in 1920. The railroad business is subject to two controlling factors—economic conditions and government regulation. Public policy can determine the relations of the government to the railroads, but the economic forces to which the railroads are subject can be modified only by changes in prevailing economic conditions. There is no legislative panacea that will completely solve the railroad problem or any other economic difficulty.

The Transportation Act

In adopting the Transportation Act of 1920 Congress recognized the fact that the war had brought about large changes in the conditions under which production and transportation must in the future be carried on in the United States. In legislating for the railroads in 1920, the primary purpose of Congress was not to correct railway abuses, but to facilitate the re-establishment of railroad credit, thereby making possible the improvement and extension of railroad facilities. It was a constructive and not a punitive measure.

The provisions of the Transportation Act of 1920 as regards the adjustment of disputes concerning wages and working conditions are among the most important. The law provides that employers and employees shall negotiate with each other and by negotiation settle as many controversies as possible. When disputes as to working conditions cannot be settled by negotiation, they may be considered by boards of adjustment established by agreements of employers and employees. These boards of adjustment may be either local, district or national. They are composed of representatives only of the carriers and their employees. There are to be no public members of the adjustment boards. Disputes as to wages that cannot be settled by direct negotiation by the parties in interest are to be referred to the Railroad Labor Board of nine men, three representing the carriers, three the employers and three the public. No boards of adjustment, local, district or national, have thus far been established. This deadlock remained unbroken. The President promptly appointed the Railroad Labor Board in the spring of 1920, and a few months after it had been established, it decided a dispute as to wages that had been pending for more than a year. About $700,000,000 was added to the wages of railroad employees by this decision. In January, 1921, the Railroad Labor Board began hearings on the question of the continuance or abolition of the national agreements as to working conditions that had been entered into by the United States Railroad Administration with the railroad unions other than the four brotherhoods having to do with train operation. Three months later the Board decided that the national agreements should be terminated July 1 of this year. Prior to that date, the carriers and their employees are to work out new agreements to be submitted to the Labor Board for its approval.

Present Railroad Problems

It may be helpful to analyze some of the major questions with a view to stating some of the factors that must be considered in bringing about satisfactory conditions as regards railroad transportation.

The question that reaches to the heart of the matter is, "How can the railroads increase net operating income?" To find an answer to this question, the railroads must somehow reduce operating expenses. This they are striving to do by efforts to increase operating efficiency and to reduce the costs of materials and labor required for the performance of the services rendered. It is recognized by the railroads that rates and fares cannot be increased. Gross revenues will undoubtedly rise with the gradual revival of business as economic conditions return to normal. It is, however, believed that the increased net operating income that will come with the gradual expansion of business will not be sufficient to re-establish the financial stability and the credit of the railroads, unless the cost per unit of service can be greatly reduced.

The first step towards the accomplishment of greater economies in the operation of railroads is the larger co-operation of the carriers with each other in the performance of their services. In terminal organization and management the co-operation of the carriers is especially urgent, and in this field undoubtedly many economies can be brought about.

The Committee feels that an earnest effort on the part of the carriers to reduce operating expenses wherever possible, and to increase the efficiency with which they conduct their business will be appreciated by the public. Whatever economies may be effected by changes in operating methods, there must inevitably be a reduction in the percentage which salaries and wages comprise of the total operating revenue. The pay roll of the railroads in 1917 amounted to $1,700,000,000, or about 45 per cent of the operating revenue. In 1920 the pay roll had more than doubled, having risen to $3,750,000,000, which was about 60 per cent of operating revenue. Readjustment of salaries and wages is in progress in all industries, and it is to be assumed that railroad wages will in the future, as they have in the past, bear an equitable relationship to wages paid in other activities. The Railroad Committee assumes that every effort will be made by the carriers to maintain equitable scales of wages for different classes

of employment. While wages must be reduced, no class of labor should bear an inequitable share of the burdens of the rehabilitation period and all should render a full eight hours' service for eight hours' pay.

Capital Requirements

For several years comparatively little new capital has been invested in railroads. Had there been no European war, and had business conditions been prosperous, from $3,000,000,000 to $5,000,000,000 would have been invested in American railroads during the past six or seven years. In order that the business of the country may revive and go ahead at a desirable pace, a large amount of capital must be put into the facilities for railroad transportation.

This capital must be obtained by railroads owned and operated by private corporations, and the capital must be supplied by the investing public. It is obvious that the public will not invest in the railroads unless a return of at least five and one-half or six per cent per annum is reasonably certain. In planning for the future of the railroads, provision must be made for a net operating income that will enable the railroad companies to pay a reasonable return upon capital investment.

Consolidation and Federal Incorporation

The Interstate Commerce Commission is working upon a plan for the grouping or consolidation of American railroads into a limited number of permanent competitive systems of approximately equal strength and stability. The plan of voluntary consolidation is to be tried out. At the present time it is uncertain how far railroad companies will be disposed to go or how far they will be able under probable financial conditions to proceed in accomplishing the grouping or consolidation of our many railroad lines into the contemplated limited number of large permanent systems. The grouping or consolidation of railroads must ultimately be accomplished. In order to maintain rate structures that are fair to the public as a whole and adequately profitable to the railroads, it is necessary to have railroad systems of approximately equal financial stability and strength. In order to enable those sections of the country now served by weak and struggling railroads to obtain the transportation facilities required in the public interest, it is necessary to do away with the "weak sisters" as separate entities.

The Committee does not recommend additional legislation on the railroad question at the present time. It will be desirable to have further experience under the Transportation Act of 1920 before considering amendments or additions to that law. As has been pointed out in this report, the railroads are sharing with other enterprises the misfortunes of the hour. Before another year is over, it is possible that business conditions and railroad traffic and earnings will be more favorable. Another year will give Congress a better perspective of the railroad situation. In the meantime, a Committee of the Senate will have inquired into the present difficulties of the railroads and into the workings of the Act of 1920. That investigation will enable Congress to act with a fuller knowledge than it possesses at the present time.

The Shippers' Viewpoint

E. J. McVann, secretary of the Smokeless Coal Operators' Association of West Virginia, led the discussion from the point of view of the shipper. Mr. McVann emphasized the point that whatever suggestions he had to offer were tendered in the spirit of helpful co-operation rather than in that of destructive criticism. He sketched the growth of the mileage of the railroads of the country from 30,000 in 1860 to 260,000 in 1920 and remarked that any country which could show such a record of accomplishment need not be greatly alarmed by the present railroad situation, perplexing though it is. One of the difficulties of the railroads in the past, according to Mr. McVann, was that regulation showed to some degree a lack of knowledge of the subject. Now, he said, the same difficulty was being experienced again in the demands which are being made on Congress for amendments to the Transportation Act before it has been given a fair trial.

Mr. McVann quoted figures to show the present high operating ratios of most of the roads and emphasized the necessity of reducing expenses. He declined to express an opinion regarding the contention which is being made in some quarters to the effect that the present high freight rates are "higher than the traffic will bear" and that they are delaying the return of normal prosperity. "A little ray of light" could be made out in the present dark outlook, Mr. McVann said, in the reports of a slightly declining car surplus.

As a possible solution of one phase of the railroad problem Mr. McVann suggested a campaign for greater car mileage per car per day. He gave as an example of the possibility of improvement in this direction the case of the Virginian, which road, he said, when faced with an acute car shortage a year ago was enabled to increase its mileage per car per day from less than 25 to more than 60. He remarked that in the days of congested traffic last year miles per car per day of all the roads reached the highest figure in history only to decline when traffic fell off. Mr. McVann considered that such economies as this offered the opportunity for increasing service without additional capital.

Another point which was particularly stressed in Mr. McVann's address was the waste of the present lack of co-ordination of terminal facilities. He said also that waterways should be used to a greater extent to relieve railway congestion. Waterways, he said, should not be considered as competitors to the railways but should be co-ordinated with them. As an example of this he cited the railways which make a special business of moving coal up to the lake ports for the lake boats and which carry ore to the coal regions as a return load. He closed with a plea for better water terminals for the railroads.

The Opinion of an Engineer

F. A. Molitor, who discussed the railroad problem from the point of view of an engineer, devoted his address almost entirely to the labor phase of the problem. He first gave some index numbers on the cost of living and railroad wages, with 1915 as a base at 0. The index numbers he gave for 1916 were 8.7 for cost of living and 7.3 for railroad wages; for 1917, 31.3 as living cost and 29.9 as wages; for 1918, 71.0 as living cost and 52.2 as wages; for 1919, 72.2 as living cost and 71.0 as wages, and for 1920, 104.0 as living cost and 117.6 as wages. He called attention to the following: that in 1920 the wage index greatly exceeded the index for the cost of living; that the wage index of 117.6 was the average for the whole year of 1920; that with the July, 1920, wage award wages are now at the index of 130.0 while prices have receded from 1920 to 81.2 in January, 1921.

Mr. Molitor estimated that the railroads would fail to secure their legal return this year by about one billion dollars. He believed the abrogation of the National Agreements, which he was not so sure would be brought about, would result in a saving of not more than $250,000,000. This would leave $750,000,000 yet to be taken care of. This, he said, could be done either by an increase of about 1¾ mills per ton per mile in freight charges or by reducing wages. If wages should be reduced to the level previous to the July, 1920 award a saving of $700,000,000 would be effected, according to his estimate. This would still leave $50,000,000 to be taken care of, and Mr. Molitor would do this by a further reduction of one cent per hour in every wage rate.

Mr. Molitor asked that no favoritism be shown in dealing with labor. He urged also that the managements of the roads should take the public into their confidence more than they have and that the open shop, with piece work, should be restored. Discipline, he said, should be improved and employees should be made to realize the quasi-public nature of their position in which strikes should not be permitted; they should learn that they are not a privileged class. He advocated the incorporation of the unions, the access of the public to their records and the provision for a secret ballot on strikes. He expressed the opinion that the final valuation of the carriers would be in the neighborhood of 25 billion dollars and suggested that freight rates to pay 5½ per cent on that sum would be rather high. He closed his address with an appeal to the bond holders to assist in solving the problem.

President Finds Railroad Problem Difficult

Cabinet Still Seeking Solution—Complaints from Many Quarters That Present Rates Check Business Revival

WASHINGTON, D. C.

PRESIDENT HARDING and members of his cabinet are finding the railroad problem one of great difficulty and many complications. Efforts to regard it as a Gordian Knot to be severed by a single sword-stroke have thus far proved fruitless, and something like the "watchful waiting" policy of the last administration seems to have been adopted, but apparently the administration is still hoping with some impatience for an Alexander who will make it unnecessary for the Interstate Commerce Commission and the Railroad Labor Board to continue their slow progress of trying to untie the knot. The problem, from the viewpoint of Washington officials, is how to reduce rates in view of the position taken by the railroads and the Interstate Commerce Commission that there can be no general reduction in rates until the foundation has been laid for a reduction in operating costs, and that material reductions even in rates on particular commodities can hardly be made until it is shown, somewhat more conclusively than by a mere assertion, that the reductions will so increase the movement as to result in better net revenues.

Recent cabinet meetings have been very largely devoted to the economic situation, with particular reference to agriculture, industry and transportation, and the President and his advisers appear to have been persuaded that the railroad question is the key to the whole problem, but they have as yet found no "plan" or "solution." As yet there is great reluctance on the part of the administration to go over the heads of the bodies constituted by law to decide on wages and rates but it is understood that some impatience is being felt at the length of time required by those bodies to function under the provisions of the laws from which they derive their authority and the President is still giving some consideration to the plan of calling a general conference of representatives of various interests to see if something cannot be done by agreement. It is understood that the question has also been raised at cabinet meetings as to whether the existing machinery for the regulation of rates and wages, which makes it impossible for the Interstate Commerce Commission to act with a free hand but requires it to await the action of another body, is not too cumbersome to keep pace with economic conditions and as to whether the forthcoming investigation by Senator Cummins' committee may not develop the need of some change in the law.

The theory also persists in some quarters that the rate-making rule of the Transportation Act, which requires the Interstate Commerce Commission to take into consideration operating expenses and to try to make rates produce "as nearly as may be" a 6 per cent return in the cause of the high rates and that its repeal would in some way reduce rates which in January and February did not even pay expenses for more than half the roads. This theory entirely ignores the fact that if the Interstate Commerce Commission should be convinced that lower rates would produce more net revenue it would be complying with the law if it reduced the rates, and it is advanced rather by the habitual critics of the railroads, but many Senators and others who are receiving floods of complaints from their constituents who believe they could make more money if rates were lowered, find it easy to believe that they are not proposing to injure the railroads in any way because the belief is so commonly held that the railroads would make plenty of money if they would only reduce rates enough to increase their traffic.

As the rates, rather than the expenses which have caused the advances in rates, represent the point of contact between the railroads and commerce, the President and his cabinet are looking at the problem largely from the standpoint of the effect of the rates as it has been stated to them by numerous complainants. They have apparently been convinced that the level of the rates, particularly those on basic commodities, is largely responsible for the halting condition of business generally, and somewhat disturbed that prompt action cannot be taken to bring about a reduction at least on some of the commodities as to which the freight rate represents an important factor in the cost.

Cabinet Looks at Problem from Standpoint of Rates

The President showed in his address to Congress a recognition of the fact that the present high cost of transportation is an inheritance from the period of federal control and he is showing no disposition to urge a general reduction of rates without regard to the cost, because he has no desire to return to the plan of making up deficits from the federal treasury as was done for 28 months, but he is convinced that certain rates are too high and that their reduction would have a beneficial effect. For example, it has been represented to the President that the citrus fruit growers of the Pacific coast are unable to market their products in the East at a price that will give them any return after paying freight and the middlemen's charges, that grain prices have fallen so low that the farmer has little left after paying the freight and that the principal reason for the no-market condition in the coal industry is that consumers are holding off their orders waiting for lower prices to such an extent that the country is heading into a coal shortage situation similar to that which existed last year. It is assumed by those who complain about the rates that a reduction in coal rates, for example, would reduce the price sufficiently to attract buyers. Administration leaders also are convinced that the application of a uniform percentage advance was a mistake and it is apparent that any move to bring about a readjustment which would speed up the movement of certain basic commodities will have their support, but there is no one who has any authority to give orders to the Interstate Commerce Commission to reduce rates without awaiting action by the Labor Board to reduce expenses nor to the Labor Board to speed up a wage decision.

The coal situation is being pointed to by those who insist that the application of a uniform percentage advance last August was a mistake, although at the time the rates were made the purchasers of coal were bidding against each other to get it almost regardless of price.

Complaints Made to I. C. C. Concerning Rates

The Interstate Commerce Commission has before it many formal complaints asking for rate reductions, and presumably these represent the rates which the shippers feel it is most important should be reduced, but the commission is following the usual procedure in handling these cases and is not inclined to pay much attention to such requests as were made of it last week by a delegation of Congressmen and delegates to the convention of the National Farmers' Union that it order a summary reduction in rates. The complaints regarding rates which reach Washington are of several kinds. There is the argument that the railroads are a public servant and that as low rates are desirable the railroads ought to reduce their rates regardless. If prices can-

not be regulated rates can. There is the complaint of the grain grower, the price of whose product is fixed by the market and has fallen so low that it leaves the producer very little after transportation costs have been deducted. There is also the complaint of the fruit and vegetable growers, whose products still cost the consumer about as much as ever but who are told by the middlemen that the freight rate leaves practically nothing for the producer. There are also many articles on which the price has been reduced, in spite of the rate increase, but apparently not enough to break the "buyers' strike" and it seems easy for many to believe that a reduction in the freight rate would move the business. There are also heard in Washington occasionally the voices of those who have not yet discovered that the "transportation crisis" of which they read in the newspapers is not the same kind of a crisis that was experienced last year and they are advocating waterway improvements to "take the load off the over-burdened railroads."

Considered at Cabinet Meeting Tuesday

At the cabinet meeting on Tuesday the discussion regarding the program for a "return to normalcy" apparently turned aside a little from the freight rate question to a consideration of what can be done in other directions to improve business conditions, for it was stated at the White House that there were no new developments in the railroad situation but that the Federal Reserve Board was going to relax a little the harshness of its efforts to promote deflation and that it would encourage a more liberal credit policy in the agricultural sections and in some industrial sections which have been complaining of "frozen credits" as well as of freight rates.

Another Letter from Chairman Clark

Chairman Clark of the Interstate Commerce Commission is becoming a voluminous letter writer in his replies to Congressmen and others who write to him urging a reduction in rates as a means of restoring business. The letters are not made public by the commission but some of them have been given out by the recipients. A few have already been published in the *Railway Age*.

In a letter to Senator Willis of Ohio, Mr. Clark said:

> The commission is as anxious as the shipper and the carrier to find a solution of the transportation problem. We are well aware and I think fully advised of the unfortunate conditions that exist at the present time. We cannot, however, look at the situation from one side alone. It is not a question to-day whether or not the rates shall produce 5½ or 6 per cent upon the value of the carriers' properties. The unfavorable conditions in commerce and industry generally and the unfortunate plight of individuals and individual industries can not be worse than the present plight of the railroads. It is obvious that the present condition can not long continue without general and widespread bankruptcy of the railroads.
>
> We have participated in some instances in arranging and encouraging readjustments of rates where it has been made clear that such readjustments would move a substantial volume of traffic at rates that would yield some profit, which traffic would not otherwise move at all, but, in view of the facts above stated, it is difficult to see how the commission could urge any reductions in rates that would result in reductions in the revenues of the carriers which, as stated, are insufficient now to pay the interest on their bonds, to say nothing of any return to the stockholders.
>
> This whole subject is receiving the most careful study and consideration. It is obvious that until a wider margin can be established between the dollar earned and the cost of earning it conditions cannot substantially improve. This result must be brought about through appropriate readjustment of operating expenses, the adoption of every possible and reasonable economy and general revival in business. We are not hopeless nor pessimistic as to the future.

Conference on California Fruit Traffic

The Interstate Commerce Commission on April 23 took cognizance of the numerous complaints regarding the rates on fruits and vegetables by announcing that Henry J. Ford, special assistant to the commission, and formerly a commissioner, will conduct conferences relative to rates on fruits and vegetables in Los Angeles, Cal., on May 3; in San Francisco, Cal., on May 6; and in Denver, Colo., on May 10. These conferences were called at the request of the California and Colorado legislatures, which passed resolutions requesting the Interstate Commerce Commission to investigate the alleged serious situation of producers of fruits and vegetables in those states.

The conferences are to be held between shippers and carriers, and while they relate primarily to the rates to and from California and Colorado points, carriers' and shippers' organizations from other fruit and vegetable producing districts will be granted an opportunity of making statements at these conferences relative to the general situation if they so desire. The commission's Bureau of Traffic has been investigating the fruit and vegetable situation for some time.

The Washington newspaper correspondents on April 26 received a statement "from producers and shippers of perishable and high tonnage commodities on the Pacific Coast," declaring that California's entire cantaloupe crop is endangered by the excessive freight rates to the East, according to telegrams received by Senator Shortridge of California from growers and bankers of Southern California. The Senator was quoted as saying that the crop is valued at about $11,000,000, of which a great portion will be lost to the growers if freight rates are not reduced and he urged the establishment of emergency rates.

"Loss of Entire Package"

THIS IS THE TITLE of one class of the freight claim agent's problems, distinguishing such cases from pilferage, wreck damage and other kinds of trouble. "Loss of entire package" necessitates oftentimes a persistent pursuit of many blind leads. This was the subject of a recent address by E. F. Ford, freight service inspector of the Chicago, Burlington & Quincy, at Kansas City, from which the outstanding lesson is that even the most puzzling and complicated loss and damage cases are due in most cases to disregard of the simplest fundamental rules. Mr. Ford cited four illustrative cases, all of which would have been prevented by these four rules: (1) Look at marks. (2) If boxes are numbered, put numbers on way-bill and compare the numbers in checking. (3) File receipts with care. (4) Freight for which there is no way-bill should be delivered only on satisfactory evidence of ownership. Following is an abstract of the descriptions of the four cases as given in Mr. Ford's address:

Case 1.—Claim for $369 for shortage of a case of dry goods No. 4707 consigned to B. M.; unloading tally showed it checked out OK but when consignee called no trace of it could be found. After checking B. M.'s receiving records and finding no trace it occurred to me that this firm's freight was floored next to McCord's and that it might have got into a trap car made up for that firm. I accordingly called on and checked the receiving record at McCord's and, sure enough, found it duly recorded, even to the same case number. Months had elapsed since the transaction; and while McCord's receiving record was clear the stock record was not; and it required several visits to the manager before he was convinced that the goods moved through his stock.

Case 2.—Claim for $1,200 filed by an Eastern shipper for alleged loss in transit of a centrifugal pump consigned to S. T. C., Kansas City. Our unloading record showed a clear tally, but we could not show delivery; and the consignee's receipt was missing from files. A special visit to the S. T. Company was rewarded by finding the pump set up and in operation; and it was identified by the shop number on the pump.

Case 3.—Several large consignments of drugs in boxes shipped from Philadelphia to J. W. & B., Kansas City; claim for shortages to the value of $750. This transaction involved a total of several hundred boxes, and when they left the factory each box was stenciled clearly and was numbered, bills of lading carrying the same numbers. Originating Eastern line did not put those case numbers on way-bills. Successive consignments overtook one another and got mixed at our junction with the Eastern line. The checkers applied the proper number of cases against each billing and forwarded to Kansas City; and delivery was made of enough cases to fill out each way-bill, as long as the cases lasted. Now, one of these cases would contain high class drugs valued at, say, $65; another would be valued at perhaps $2. By disregarding case numbers, and not enough cases eventually showing up to balance the transaction, it was left to the honesty of the consignee to base his claim upon the higher or lower priced goods, just as he chose. Our delivery record being faulty as to case numbers, and the teamster's records being no better, we were at the mercy of J. W. & B., but that firm was found to be managed by a man who proved to be the very soul of honesty and square dealing.

Case 4.—Seven bundles of rugs which checked over in a certain car on billing of other rugs for W. V. These seven bundles were delivered as an overage to W. V. on that billing and without lifting bill of lading or certified copy of invoice. On account of faulty and incomplete records at W. V.'s we have never been able to convince them that they received seven bundles of rugs which did not belong to them. V. also has a house at Denver and one at Dallas; and what happened, as a matter of fact, was that the shipper billed the seven bundles to V. at Denver or Dallas and marked them to V. at Kansas City in error.

In case 1 the trucker went wrong by flooring a B. M. case in McCord's section; and the check clerk who later made up the trap car for McCord compounded the trucker's error by not securing a careful check. In case 2 we seem to have handled the pump all right, but we could not produce the receipt. In case 3 the Eastern line went wrong by not billing the case numbers; but we would have been safe, nevertheless, had we taken those individual case numbers and had made an accurate check upon delivery. In case 4 we simply gave W. V. seven bundles of rugs without proof of ownership.

Important Freight House Rules

1. Be on the lookout that your freight is plainly marked to start with; if it carries two or three marks and you are very busy don't load it but set it aside until the marking can be made right.

2. Look out for foxy teamsters slipping in bills of lading for receipt on freight that they take to some fence and dispose of.

3. Mr. Trucker: When you are not sure of your section or your car, drop your truck right there, and ask your stowman or check clerk to set you right.

4. If cases carry numbers which are not on the receipts enter such numbers.

5. If a consignee advises you that a certain overage is due on a preceding bill, find out what was delivered instead of it. If receipt is clear and if that article, according to your record was astray, or over, keep after him for proof of ownership until you get it.

6. When certain overages are still on hand despite reasonable notice to consignee, open such packages and give him a complete invoice, including stock or invoice numbers found within.

7. Notices sent out on arrival of astray and over freight should carry the fullest possible description. If notice is furnished at the start, nine times out of ten you will find consignee is able and quite eager to surrender documentary proof or advise you what billing it is short on, perhaps over some other road.

8. If you are still unable to get a reply after fair notice, arrange for a representative to make a call. Exhaust every effort to secure disposition before you finally report that you cannot; because, when you do thus report, such articles are forwarded to the over freight station and are sold for little or nothing.

Tests of Franklin Precision Power Reverse Gear

UNUSUAL AND INTERESTING tests of the new Franklin Precision power reverse gear, manufactured by the Franklin Railway Supply Company, Inc., New York, were made recently at Franklin, Pa. The objct was to put the gear through tests that would duplicate locomotive service as nearly as possible and to subject it to conditions more severe than would occur on the locomotive itself. The specific purposes of the tests were to determine whether the piston would absorb valve motion shocks without moving, whether the gear would remain when set without creeping, whether the cut-off could be readily adjusted under load, whether the cut-off indicator and gear would work in synchronism, whether shocks and stresses would be eliminated from the control going to the cab and whether the gear would automatically and instantly resist movement if an unbalanced load was suddenly applied.

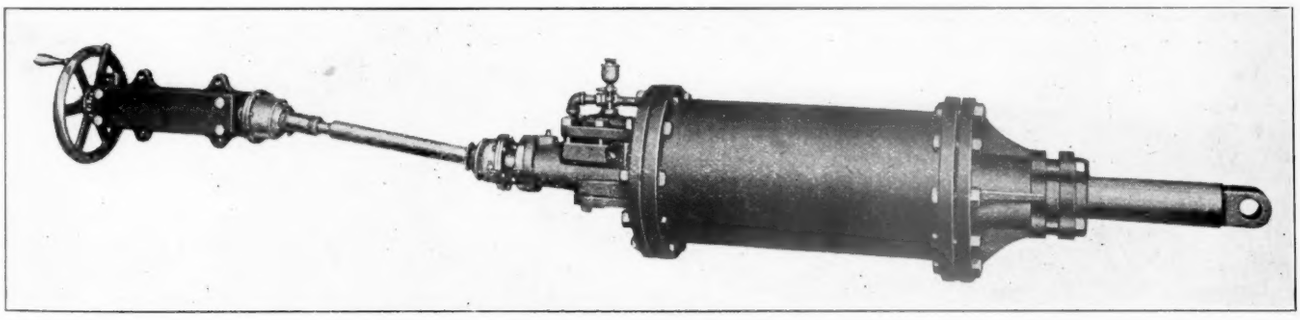


Fig. 1—Gear Assembled as Applied to the Locomotive

To determine these points special testing apparatus, shown in Fig. 2, was constructed. The gear was secured to the frame in the same way in which it is applied to a locomotive. Application of the cab control wheel and operating rod was made in the same relative position as actual service requires and the cut-off indicator set at its proper relation to the gear. Compressed air at a pressure of 105 lb. per square inch was applied to the cylinder. A set of gages was attached to the cylinder compartment for pressure reading, bleed cocks being installed at each gage.

To subject the reverse gear to stresses similar to those re-

ceived from the valve gear when a locomotive is running an extended rod was attached to the gear piston rod. This rod passed through an adjustable friction clutch by means of which varying and very heavy resistances could be applied. To the friction clutch was attached a connecting rod, which was operated by an eccentric with one inch travel, driven by an electric motor. The eccentric served to reciprocate the clutch on the extended piston rod, subjecting the gear to shock and reversal of stresses equaling those occurring in actual service.

Frictional resistance between the adjustable clutch and extended piston rod was obtained by tightening the clutch. These frictional resistances were calibrated by hanging known weights on a cable which passed over a pulley and was hooked on the extended piston rod. When the friction of the clutch stopped the weight from moving, the frictional resistance equalled the load on the cable. This weight arrangement was used to establish a known frictional resistance.

Two conditions were considered, the first where the force acting on the gear piston was the same in both directions, the second an unbalanced force acting in one direction only. In the first case the desired frictional resistance between the clutch and rod was obtained as outlined above, and the cable and weights were disconnected from the rod. The motor was then started and the clutch forced to travel back and forth on

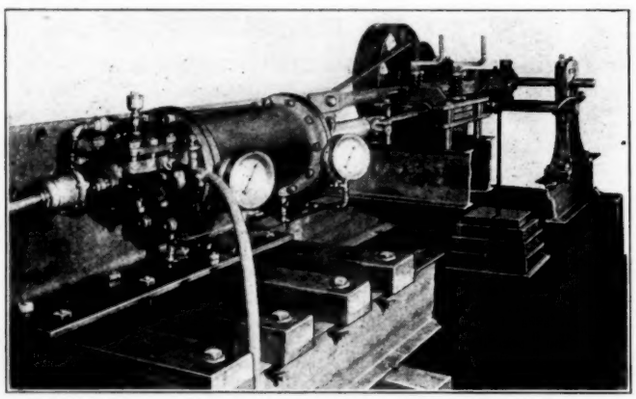


Fig. 2—Gear with Rod and Clutch Attached for Test

the piston rod 320 times per minute. Observations were taken on ten separate tests, each test being run without a stop for 30 minutes.

To duplicate the condition of an unbalanced force acting on the gear in one direction only the frictional resistance of the clutch was first set to equal the weight hung on the rod and the weight not disconnected.

In starting these tests observations were taken with no load on the gear in order to establish the position of the cab indicator relative to the actual point of cut-off. Moving the indicator from corner to corner and setting to any desired cut-off the relative positions of the indicator and piston checked in every case within 1/32 in.

Seven separate running tests were made with the clutch operating against the gear in each direction. The first test was run with 500 lb. frictional resistance between clutch and piston rod and the resistance was increased 500 lb. for each test until a load of 3,500 lb. was reached. With the motor reciprocating the clutch 320 times per minute there was absolutely no movement of the piston. The gear was moved from corner to corner slowly or as rapidly as desired and the cut-off always checked with the position shown by the cab indicator. While under load the force required to adjust the cut-off was so small that the operating rod could be rotated by hand without using the cab control wheel. The gear absorbed all shocks, no vibration or stresses being transmitted to the cab control wheel or indicator.

To demonstrate the operation in case of leaks the pressure in the cylinder was bled down approximately 15 per cent. Under these conditions the piston moved .005 in. each way under load. When the leakage cock was closed the pressure automatically rose and stopped entirely all movement of the piston.

To determine the effect of an unbalanced load in one direction only the clutch was set for 2,000 lb. and weights left attached, the clutch and weight equaling 4,000 lb. one way and zero the other. Under these conditions the gear immediately set up the differential pressure in the cylinder required to absorb the shocks. There was no movement of the piston and bleeding of each cylinder compartment by hand had no effect.

To further unbalance the load the clutch pressure was increased to 2,500 lb., making a load of 5,000 lb. acting on the gear in one direction only. No movement of the gear was perceptible, the cut-off being held as rigidly as before.

Description of Gear

This power reverse gear, as its name implies, is designed for precise adjustment of cut-off. It consists of a 10 in. by 18 in. cylinder with all parts enclosed. It has ample strength for the heaviest work. The operating valve is attached to the rear end of the cylinder and is controlled by a hand wheel in the cab. This wheel is provided with an indicator showing the point of cut-off and is connected to the gear by an operating rod. This wheel and rod are relieved of all stresses or shocks in the functioning of the gear.

No crosshead or guide is used with this gear, the thrust being taken through the piston. Levers and rods have been eliminated and there are no pins or bushings to wear and affect the accuracy of cut-off. No adjustments are provided as none are required. Wearing parts have been reduced to the minimum. Steam can be used as a medium for operating the gear in emergencies.

The results of the tests described above show that the gear provides extremely accurate adjustment of cut-off and freedom from creeping. Pressure is automatically set up to resist sudden unbalanced forces and maintain stability of adjustment. All shocks from the valve gear are absorbed by the air in the gear cylinder. The design gives a low air consumption and provides adjustment of cut-off with minimum physical effort. When air is cut off the gear remains positioned corresponding to the last adjustment and cannot be changed until air or steam is again used.

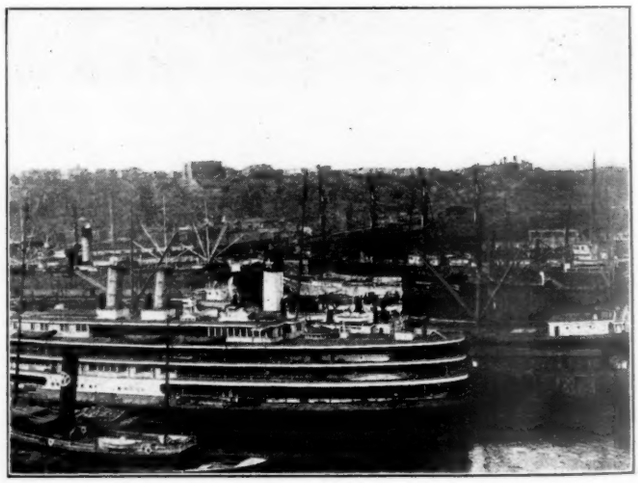


Photo by Keystone

Idle Shipping at Hoboken, N. J.

General News Department

A. H. Rudd, chief signal engineer of the Pennsylvania system, presented a paper on "Modern Signaling" before the Railway Club of Pittsburgh, Pa., on April 28.

President Harding has been asked by the Washington representatives of the four brotherhoods of train service employees, and by local representatives, to urge a Congressional investigation of the situation on the Missouri & North Arkansas, where the train employees have been on strike. It is charged that the management had violated the orders of the Railroad Labor Board.

Senate Railroad Investigation to Begin May 10

Senator Cummins, chairman of the Senate committee on interstate commerce, has announced that the committee's hearings in the general inquiry into railroad conditions will begin on May 10, with railway executives as the first witnesses.

Progress in Automatic Train-Control

The Bureau of Safety of the Interstate Commerce Commission and the American Railway Association will at once place inspectors on the Chicago & Eastern Illinois and Chicago, Rock Island & Pacific to watch the operation of the automatic train stops which are in use on those roads and to report on the effect of automatic train control on railroad operation. The two inspectors representing the government are P. W. Jones and R. B. Johnson, the recently appointed examiners. Those for the American Railway Association are O. C. Underwood, formerly signal supervisor, Southern Railway Lines, East, and L. C. Heilman, formerly office engineer, signal department, Chicago, Rock Island & Pacific. Messrs Johnson and Underwood are assigned to the Chicago & Eastern Illinois and Messrs. Heilman and Jones to the Rock Island.

A. W. Newton, chief engineer of the Chicago, Burlington & Quincy has been appointed an engineering member of the joint committee on automatic train control, in place of H. R. Safford, who resigned recently.

Senator Capper Would Repeal 6 Per Cent Rule of Rate-Making

Senator Capper of Kansas on April 25 introduced a bill to repeal the 6 per cent rule of rate-making in Section 15-a of the act to regulate commerce as amended by the transportation act, and the Senator issued a statement to the press which indicated a belief on his part that the repeal of this section would tend to reduce freight rates. The Senator's bill would also repeal the provision of the law under which the Interstate Commerce Commission has taken jurisdiction to order increases in intrastate rates on the ground of discrimination against interstate commerce. The bill would amend the first paragraph of Section 3 of the act to regulate commerce as amended by Section 405 of the transportation act, the first paragraph of Section 15 as amended by Section 418 of the transportation act, repeal paragraphs 3 and 4 of Section 13 as amended by Section 416 of the transportation act, and repeal Section 15-a as amended by Section 422 of the transportation act. The Senator's statement took the position that a reduction of freight rates would save the railroads from receivership and bankruptcy.

A New Proposal for the Canadian Railway Crisis

Lord Shaughnessy, chairman of the Canadian Pacific (speaking, however, as an individual citizen and not officially), has written to the Prime Minister, proposing that all of the government-owned railways of Canada be put into the hands of the Canadian Pacific, to be operated by that company, along with its own lines, as a single system. He says that even at this late date, it would be wise for the government to drop the Grand Trunk; that the Canadian Pacific could manage the National lines under a perpetual contract; that the National Transcontinental scheme was a deplorable blunder in conception and execution, and that wages and working conditions are on a fictitious basis, and must be amended. Savings would result from consolidation by elimination of unnecessary train service, duplicate terminal work, and common use of cars and locomotives.

Lord Shaughnessy submits an elaborate tentative plan for solution of the difficulties that confront the government. He would relieve the Grand Trunk of some of the burdens it is now carrying. He would provide for certain guarantees to the stock and bond holders of all companies concerned, improving as the situation improved; and he would look hopefully to the wiping out of the deficit by immigration and development of the country.

International Chamber of Commerce

The International Chamber of Commerce, in which the United States Chamber of Commerce is interested, is to hold a meeting in London June 27-July 2, as noticed in the *Railway Age* of April 22, page 1000. It will discuss various important aspects of the general topic, "Restoration of the World's Commerce." The United States has been assigned leadership in one of the five divisions of the Congress, namely, "Transportation and Communications." Walker D. Hines, who is now engaged in the arbitration of questions pertaining to European River Shipping, is in charge of this subject. Other divisions of the London Congress, such as finance, production and distribution are organized under the auspices of Britain, France and Italy. The Transportation Group, under Mr. Hines' general direction, has been organized in four branches as follows: Communications, John J. Carty, chairman; J. Rowland Bibbins, secretary. Port Facilities, L. B. Stilwell, chairman; N. Sumner Myrick, secretary. Ocean Transportation, H. H. Raymond, chairman; N. Sumner Myrick, secretary. Land Transportation, Chairman to be assigned; Richard Waterman, secretary. These committees are already at work on the programme.

Freight Claim Division A. R. A. Meeting Chicago, May 17 to 19

The Freight Claim Division of the American Railway Association will hold its 30th annual session at the Hotel Sherman, Chicago, on May 17, 18 and 19. Coronado Beach, Cal., had originally been selected as the place of meeting, and Denver, Colo., had been substituted later. The present railroad situation made necessary a further consideration, however, and Chicago was selected. Wednesday, May 18, has been set aside for a special order of business, at which the report of the Committee on Cause and Prevention, followed by a discussion of claim prevention matters, will occupy the attention of the members throughout the day.

Hoover Resigns from American Engineering Council

Herbert Hoover has resigned as president of American Engineering Council of the Federated American Engineering Societies. Mr. Hoover's resignation was submitted and accepted as the closing action of the sessions of the council held April 16 at the Engineers Club of Philadelphia, Pa. Mr. Hoover gave as his reasons the fact that American Engineering Council by its constitution was necessarily engaged in furthering national activities which involve legislation; and that he as a member of the executive branch of the government could not consistently direct such activity as an officer of American Engineering Council. The council, in a resolution of regret at Mr. Hoover's retirement, voted its appreciation of Mr. Hoover's leadership during the organization period of the council and his initiation of policies and effort.

One of the most important matters before the council was the

Operating Statistics of Large Steam Roads—Selected Items for the Month of January, 1921,

Region, road and year	Average miles of road operated	Freight Service: Locomotive-Miles: Train-miles	Locomotive-Miles: Principal and helper	Locomotive-Miles: Light	Car-miles: Loaded (thousands)	Car-miles: Empty (thousands)	Car-miles: Per cent loaded	Ton-miles (thousands): Gross, Excluding locomotive and tender	Ton-miles (thousands): Net, Revenue and non-revenue	Locomotives on line daily: Serviceable	Locomotives on line daily: Unserviceable	Locomotives on line daily: Per cent unserviceable	Locomotives on line daily: Stored
New England region:													
Boston & Albany....1921	393	283,241	304,355	37,136	4,332	2,840	60.4	251,783	103,349	130	27	17.2	...
1920	393	294,721	313,826	33,596	5,143	1,578	76.5	247,660	109,543	126	35	21.7	...
Boston & Maine....1921	2,481	567,686	627,338	56,855	9,975	5,749	63.4	589,409	252,966	346	115	24.9	38
1920	2,482	766,459	853,721	75,259	13,007	4,962	72.4	695,517	312,233	356	121	25.4	5
N. Y., N. H. & H....1921	1,959	436,893	473,641	38,280	8,403	5,228	61.6	484,137	206,517	298	76	20.3	25
1920	1,938	530,547	564,607	38,528	11,292	2,915	79.5	539,666	249,653	318	96	23.2	2
Great Lakes region:													
Delaware & Hudson....1921	880	408,358	576,872	38,846	9,137	6,921	56.9	659,894	325,459	267	45	14.4	42
1920	858	390,164	520,320	39,033	8,327	4,760	63.6	565,808	291,180	259	35	11.9	39
Del., Lack. & Western....1921	989	502,621	616,140	123,124	13,130	7,386	64.0	778,318	361,381	354	71	16.7	17
1920	989	514,351	658,478	146,328	14,443	5,763	71.5	802,444	397,171	287	75	20.7	8
Erie (inc. Chi. & Erie)....1921	2,259	1,000,452	1,135,065	39,879	26,295	18,586	58.6	1,781,364	842,354	577	125	17.8	62
1920	2,259	1,154,783	1,313,741	42,589	30,773	13,216	70.0	1,833,157	904,482	570	193	25.2	17
Lehigh Valley....1921	1,431	556,761	618,246	54,427	13,154	8,738	60.1	859,737	409,125	381	199	34.3	86
1920	1,429	621,505	694,878	71,849	16,291	6,726	70.8	949,915	469,720	422	147	25.8	89
Michigan Central....1921	1,829	455,837	468,655	17,135	11,538	9,492	54.9	712,707	289,904	301	95	24.0	94
1920	1,826	564,114	593,007	16,930	17,041	5,117	76.9	851,934	398,308	260	94	26.6	6
New York Central....1921	5,646	2,061,483	2,313,436	178,334	55,295	51,425	51.8	3,752,700	1,570,840	1,056	434	29.1	68
1920	5,646	2,227,233	2,503,896	197,426	65,881	26,327	71.4	3,610,223	1,727,374	(1)	(1)	(1)	(1)
N. Y., Chic. & St. L....1921	572	399,135	403,061	1,526	9,596	6,995	57.8	557,817	217,424	107	55	34.0	18
1920	572	391,630	445,626	2,241	11,104	2,614	80.9	552,006	266,599	113	65	36.5	4
Pere Marquette....1921	2,207	285,093	292,914	4,534	5,798	4,087	58.7	321,412	149,594	171	35	17.0	25
1920	2,200	325,026	340,340	7,959	7,090	2,500	73.9	364,674	176,198	176	46	20.7	...
Pitts. & Lake Erie....1921	225	134,371	147,291	1,965	3,635	2,530	59.0	277,393	155,877	66	10	13.2	9
1920	225	163,441	168,224	6,815	4,782	2,955	61.8	346,664	196,948	67	12	15.2	...
Wabash....1921	2,418	610,807	630,239	6,263	13,873	7,599	64.6	805,568	357,405	275	61	18.2	15
1920	2,418	615,260	642,026	10,550	15,821	3,812	80.6	802,561	395,915	271	63	18.9	...
Ohio-Indiana-Allegheny region:													
Baltimore & Ohio....1921	5,185	1,903,582	2,415,493	137,434	39,913	35,631	52.8	2,888,905	1,342,938	1,065	265	19.9	108
1920	5,154	2,001,923	2,513,199	152,454	48,926	24,287	66.8	3,104,149	1,582,297	1,040	264	20.2	12
Central of N. J....1921	678	290,690	314,531	29,616	5,376	4,189	56.2	384,136	190,804	200	64	24.2	7
1920	679	351,902	389,800	48,534	6,424	3,834	62.6	418,861	213,202	198	61	23.6	...
Chicago & Eastern Ill....1921	1,131	281,154	283,905	3,771	5,824	4,612	55.8	397,675	195,893	115	62	35.0	2
1920	1,131	305,809	317,447	5,432	7,259	2,521	67.3	441,637	231,842	100	74	42.5	1
C., C., C. & St. L....1921	2,396	719,549	747,951	896	16,438	15,089	52.1	1,169,602	515,335	308	113	26.8	15
1920	2,393	775,417	809,652	308	20,354	8,644	70.2	1,192,641	596,256	292	112	27.7	...
Elgin, Joliet & Eastern....1921	837	149,636	165,919	11,978	3,963	2,224	64.1	316,487	175,171	95	9	8.6	4
1920	832	164,515	189,174	13,991	4,306	2,432	63.9	321,806	172,700	92	15	14.0	...
Long Island....1921	395	40,533	47,472	7,806	459	250	64.7	24,721	9,874	35	7	16.0	6
1920	395	40,545	66,194	13,992	486	241	66.9	23,704	9,589	33	14	29.8	...
Pennsylvania System....1921	10,850	4,747,538	5,272,461	417,350	100,262	78,001	56.2	7,419,843	3,692,239	2,202	893	28.9	136
1920	10,927	4,808,311	5,349,584	408,593	111,653	53,197	67.7	7,068,525	3,698,872	2,107	985	31.9	8
Phila. & Reading....1921	694	614,672	706,907	94,776	13,366	10,366	56.3	985,403	515,012	314	84	21.1	39
1920	690	678,041	779,745	99,510	15,591	7,483	67.6	1,037,634	591,775	299	74	19.8	19
Pocahontas region:													
Chesapeake & Ohio....1921	2,530	767,697	843,475	22,408	18,843	17,562	51.8	1,542,522	800,310	400	147	26.9	36
1920	2,517	846,738	951,097	32,444	22,973	14,227	61.8	1,681,850	936,122	407	132	24.5	5
Norfolk & Western....1921	2,055	814,383	994,789	37,927	19,752	16,191	55.0	1,651,564	892,492	502	175	25.8	101
1920	2,038	813,104	1,039,551	42,813	22,701	12,199	65.0	1,659,102	932,073	417	256	38.0	11
Southern region:													
Atlantic Coast Line....1921	4,889	672,415	677,921	11,936	13,038	9,769	57.1	744,930	278,831	284	122	30.0	...
1920	4,894	757,800	760,620	13,226	16,983	6,670	71.8	841,651	348,417	280	139	33.2	...
Central of Georgia....1921	1,908	229,535	230,674	2,451	4,153	2,203	65.3	242,214	115,246	112	22	16.4	...
1920	1,913	231,447	235,547	3,895	5,003	1,247	80.0	246,935	123,260	102	25	19.7	...
I. C., (inc. Y. & M. V.)....1921	6,151	1,950,244	1,963,356	40,256	41,769	31,853	56.7	2,950,135	1,350,198	710	169	13.3	4
1920	6,152	1,986,674	1,997,487	42,824	49,052	20,809	70.2	2,953,958	1,450,886	722	116	13.8	14
Louisville & Nashville....1921	5,026	1,552,210	1,669,489	57,443	23,611	16,722	58.5	1,589,882	758,822	534	115	17.7	3
1920	5,024	1,577,346	1,721,928	55,397	27,275	12,830	68.0	1,631,381	813,726	505	112	18.2	...
Seaboard Air Line....1921	3,537	437,707	446,356	9,086	8,613	5,345	61.7	485,233	188,034	171	91	34.7	...
1920	3,537	457,534	476,384	12,423	10,936	4,028	73.1	561,525	242,171	181	94	34.3	...
Southern Railway....1921	6,944	1,213,989	1,240,853	26,820	22,712	13,736	62.3	1,316,947	563,179	896	232	20.6	3
1920	6,955	1,421,758	1,481,010	53,308	33,504	10,480	76.2	1,659,953	768,349	957	182	16.0	5
Northwestern region:													
C. & N. W....1921	8,320	1,714,444	1,761,132	22,369	28,349	23,252	54.9	1,807,164	767,033	661	293	30.7	...
1920	8,062	1,741,983	1,785,817	25,670	35,114	14,770	70.4	1,919,914	833,861	688	228	24.9	...
C., M. & St. P....1921	10,603	1,412,041	1,451,167	74,680	28,923	21,192	57.7	1,727,797	741,414	677	360	34.7	58
1920	10,623	1,799,411	1,864,031	80,932	42,282	15,617	73.0	2,234,163	1,065,632	697	297	29.8	2
C., St. P., M. & O....1921	1,726	313,251	329,804	13,027	4,914	2,954	62.5	288,634	118,802	142	59	29.4	20
1920	1,726	369,875	401,790	17,804	6,180	2,446	71.6	328,151	149,908	156	50	24.3	11
Great Northern....1921	7,980	661,708	678,701	25,662	13,974	7,149	66.2	814,611	383,785	575	196	25.4	205
1920	7,986	1,076,876	1,120,270	51,439	26,493	9,289	74.0	1,364,532	670,535	524	219	29.5	22
M., St. P. & S. Ste. M....1921	4,225	483,889	490,343	7,037	9,320	5,453	63.1	538,932	248,555	336	75	18.3	80
1920	4,227	611,211	622,997	14,204	12,659	3,137	80.1	580,966	296,566	315	81	20.5	22
Northern Pacific....1921	6,408	617,287	649,113	43,692	15,317	5,862	72.3	860,999	424,868	545	138	20.1	138
1920	6,389	1,056,089	1,117,761	81,949	29,430	9,136	76.3	1,592,777	811,148	504	157	23.8	10
O. W. R. R. & N. Co....1921	2,196	184,810	200,797	22,876	3,957	1,452	73.2	219,546	109,642	119	36	23.2	...
1920	2,186	235,752	273,316	42,799	6,486	1,544	80.8	335,938	176,678	117	36	23.5	...
Central Western region:													
A., T. & S. Fe....1921	9,771	1,656,949	1,740,589	86,529	33,606	32,699	50.7	2,255,024	813,981	664	253	27.6	25
1920	9,455	1,927,465	2,029,421	92,489	49,393	21,256	69.9	2,646,056	1,129,845	686	268	28.1	12
Chicago & Alton....1921	1,010	341,688	348,318	6,615	6,106	5,412	53.0	419,949	176,780	118	42	26.3	4
1920	1,010	385,839	402,111	5,723	7,541	3,558	67.9	449,135	214,583	119	53	30.8	3
Chic., R. I. & Pacific....1921	7,662	1,336,272	1,365,718	18,228	25,350	14,925	62.9	1,461,979	642,840	564	195	25.7	18
1920	7,596	1,429,530	1,454,739	13,102	29,579	10,089	74.6	1,537,903	729,470	471	222	32.0	8
C., B. & Q....1921	9,322	1,692,809	1,773,693	86,507	37,689	30,951	54.9	2,560,124	1,187,707	680	248	26.7	32
1920	9,305	1,881,202	1,979,423	97,585	47,194	19,681	70.6	2,696,476	1,353,821	677	238	26.0	2
Denver & Rio Grande....1921	2,585	250,032	311,010	58,740	4,783	2,769	63.3	299,080	147,597	218	86	28.3	15
1920	2,585	322,865	401,364	75,865	6,374	3,059	67.6	385,909	199,217	229	90	28.2	...
Oregon Short Line....1921	2,359	273,245	285,545	23,720	5,655	3,103	64.6	353,081	171,076	173	46	21.0	19
1920	2,348	434,899	455,208	48,252	10,847	3,706	74.5	614,846	316,775	162	56	25.7	8
Southern Pacific....1921	6,975	1,059,785	1,203,821	217,393	24,334	17,525	58.1	1,502,392	589,892	521	172	24.9	7
1920	6,948	1,239,953	1,428,714	262,474	33,953	13,824	71.1	1,887,991	871,247	566	166	22.6	6
Union Pacific....1921	3,614	963,847	986,087	74,474	20,545	13,727	59.9	1,256,669	538,977	411	143	25.8	65
1920	3,614	1,235,919	1,254,967	55,440	30,759	9,494	76.4	1,624,860	790,795	371	153	29.2	5
Southwestern region:													
Galv., Hbg. & S. A....1921	1,369	317,736	318,534	994	5,833	5,188	52.9	403,511	161,457	75	41	35.3	...
1920	1,369	309,164	310,817	554	7,476	3,257	69.7	433,878	195,659	80	41	33.9	...
Gulf, Colo. & S. Fe....1921	1,903	268,822	275,687	5,750	5,888	3,923	60.0	356,761	155,272	100	41	29.1	...
1920	1,933	249,377	252,629	6,089	5,266	2,039	72.1	284,188	129,066	96	34	26.2	1
Mo., Kansas & Texas....1921	1,710	274,677	274,723	6,944	5,976	6,000	49.9	399,803	150,142	137	53	27.9	35
1920	1,710	290,612	291,231	6,602	6,568	4,049	61.9	389,230	170,357	95	37	28.0	...
M. K. & T. of Texas....1921	1,740	269,184	273,849	3,196	4,832	3,736	56.4	308,117	126,607	108	43	28.5	15
1920	1,796	243,461	250,346	12,727	3,799	2,044	65.0	211,419	90,056	116	47	28.8	3
Missouri Pacific....1921	7,261	1,161,180	1,168,375	36,051	23,210	14,497	61.6	1,448,121	655,597	377	182	32.6	2
1920	7,261	1,182,727	1,192,476	35,905	27,809	8,428	76.7	1,494,899	745,439	(1)	(1)	(1)	(1)
St. L.-San Francisco....1921	4,761	829,325	841,972	15,841	12,286	9,843	55.5	780,601	321,185	376	133	26.1	20
1920	4,761	891,125	903,244	18,815	15,395	5,899	72.3	850,183	402,437	372	115	23.6	6
Texas & Pacific....1921	1,947	371,249	371,249	5,342	7,256	5,106	58.7	439,371	170,268	119	69	36.7	...
1920	1,947	321,490	322,451	6,989	6,458	2,072	75.7	337,601	149,807	117	80	40.7	...

[1] Data not available.

Compared with January, 1920, for Roads with Annual Operating Revenues above $25,000,000

Region, road and year	Freight Service: Cars on daily line: Home	Foreign	Total	Per cent unserviceable	Stored	Gross tons per train excluding locomotive and tender	Net tons per train	Net tons per car	Net ton miles per car-day	Car-miles per car-day	Net ton miles per mile of road per day	Pounds of coal per 1,000 gross ton miles	Passenger service: Train miles	Passenger train car-miles
New England region:														
Boston & Albany.....1921	2,646	5,342	7,988	6.8	960	889	365	23.9	417	29.0	8,476	238	317,570	2,016,895
1920	513	8,569	9,082	4.5	....	840	372	21.3	389	23.9	8,984	247	318,801	2,011,651
Boston & Maine.....1921	13,877	17,534	31,411	13.7	1,541	1,038	446	25.4	260	16.1	3,289	181	855,596	4,494,166
1920	7,475	30,878	38,353	8.9	....	907	407	24.0	263	15.1	4,059	(1)	860,757	4,517,647
N. Y., N. H. & H.....1921	19,832	19,729	39,561	13.3	3,024	1,108	473	24.6	168	11.1	3,401	216	1,082,636	6,570,190
1920	7,800	36,912	44,712	5.6	....	1,017	471	22.1	180	10.2	4,155	221	1,093,365	6,680,940
Great Lakes region:														
Delaware & Hudson.....1921	7,852	9,596	17,448	8.0	....	1,616	797	35.6	602	29.7	11,925	217	185,493	963,898
1920	2,133	15,521	17,654	6.0	....	1,450	746	35.0	532	23.9	10,942	244	190,289	927,104
Del., Lack. & West.....1921	14,407	8,880	23,287	7.4	2,481	1,549	719	27.5	501	28.4	11,790	217	491,293	3,500,317
1920	3,699	19,407	23,106	6.4	....	1,560	772	27.5	554	28.2	12,957	(1)	468,836	3,352,474
Erie (inc. Chi. & Erie)...1921	24,624	27,276	51,900	9.2	8,199	1,780	842	32.0	524	27.9	12,030	182	685,922	4,728,375
1920	7,202	47,243	54,445	7.5	....	1,587	783	29.4	536	26.0	12,918	193	698,522	4,991,766
Lehigh Valley.....1921	23,830	13,810	37,640	10.3	3,034	1,544	735	31.1	351	18.8	9,225	205	378,009	2,776,408
1920	7,780	26,588	34,368	6.9	....	1,528	756	28.8	441	21.6	10,601	226	380,546	2,676,657
Michigan Central.....1921	14,156	14,486	28,642	8.8	4,327	1,564	636	25.1	327	23.7	5,112	156	589,041	4,993,748
1920	3,444	37,468	40,912	6.3	....	1,510	706	23.4	314	17.5	7,038	(1)	636,145	5,453,087
New York Central.....1921	62,622	79,342	141,964	8.4	14,373	1,820	762	28.4	357	24.2	8,974	163	2,453,122	18,689,902
1920	17,077	132,898	149,975	7.0	....	1,621	776	26.2	372	19.8	9,869	(1)	2,533,963	18,112,137
N. Y., Chic. & St. L....1921	4,315	6,299	10,614	9.5	445	1,398	545	22.7	661	50.4	12,264	137	88,142	507,653
1920	1,324	10,715	12,039	5.8	(1)	1,410	681	24.0	714	36.8	15,024	(1)	68,479	434,731
Pere Marquette.....1921	8,838	8,665	17,503	7.3	1,500	1,127	525	25.8	276	18.2	2,186	201	287,689	1,403,217
1920	3,945	20,217	24,162	6.7	....	1,122	542	24.9	235	12.8	2,583	215	292,808	1,408,837
Pitts. & Lake Erie.....1921	8,797	12,093	20,890	14.5	2,018	2,064	1,160	42.9	241	9.5	22,384	92	115,705	586,536
1920	3,761	20,180	23,941	10.9	....	2,121	1,205	41.2	265	10.4	28,292	103	106,046	525,110
Wabash 1921	10,860	13,633	24,493	10.8	....	1,319	585	25.8	471	28.3	4,768	210	552,806	2,782,020
1920	5,135	19,258	24,393	9.3	....	1,304	643	25.0	524	26.0	5,282	212	533,581	2,698,481
Ohio-Indiana-Allegheny region:														
Baltimore & Ohio.....1921	55,241	51,376	106,617	6.8	4,196	1,518	705	33.6	406	22.9	8,356	225	1,382,179	8,590,573
1920	17,160	81,941	99,101	5.8	....	1,551	790	32.3	515	23.8	9,904	(1)	1,341,275	8,199,485
Central of N. J.....1921	12,741	13,533	26,274	15.2	1,840	1,322	650	35.5	234	11.7	9,072	224	315,930	1,380,005
1920	4,065	20,800	24,865	7.8	374	1,190	606	33.2	277	13.3	10,133	(1)	312,919	1,320,067
Chicago & Eastern Ill....1921	10,263	5,363	15,626	13.9	....	1,414	697	33.7	404	22.3	5,587	198	240,075	1,532,779
1920	9,232	10,883	20,115	9.6	....	1,444	758	32.0	372	17.3	6,612	(1)	236,582	1,516,250
C., C., C. & St. L.....1921	12,800	21,626	34,426	11.2	6,861	1,625	716	31.4	483	29.5	6,937	174	770,414	4,543,237
1920	2,364	31,620	33,984	6.2	....	1,538	769	29.3	566	27.5	8,037	(1)	758,688	4,596,067
Elgin, Joliet & Eastern...1921	9,271	7,126	16,397	8.8	438	2,115	1,171	44.2	345	12.2	6,751	150	(2)	(2)
1920	8,044	8,388	16,432	6.3	....	1,956	1,050	40.1	339	13.2	6,696	(1)	(2)	(2)
Long Island 1921	1,283	3,385	4,668	4.6	247	610	244	21.5	68	4.9	807	424	189,621	1,037,611
1920	566	5,240	5,806	3.6	....	585	237	19.7	53	4.0	784	(1)	183,816	935,880
Pennsylvania System.....1921	167,206	107,234	274,440	3.9	49,870	1,563	778	36.8	434	21.0	10,977	184	5,235,592	34,246,094
1920	86,746	202,274	289,020	7.5	21	1,470	769	33.1	413	18.4	10,920	(1)	5,333,329	34,471,852
Phila. & Reading.....1921	18,508	18,530	37,038	8.9	....	1,603	838	38.5	449	20.7	23,932	225	521,189	2,358,648
1920	5,950	31,591	37,541	6.1	....	1,530	873	38.0	509	19.8	27,664	(1)	497,327	2,300,452
Pocahontas region:														
Chesapeake & Ohio.....1921	26,977	22,048	49,025	6.9	11,500	2,009	1,043	42.5	527	24.0	10,206	163	446,963	2,501,203
1920	5,755	32,549	38,304	8.3	....	1,986	1,106	40.7	788	31.3	11,998	(1)	413,382	2,262,948
Norfolk & Western.....1921	27,751	14,479	42,230	6.3	4,715	2,028	1,096	45.2	682	27.5	14,011	187	404,277	2,609,470
1920	7,993	27,690	35,683	6.3	....	2,040	1,146	41.1	843	31.6	14,750	(1)	404,897	2,577,208
Southern region:														
Atlantic Coast Line.....1921	20,124	14,087	34,211	10.2	....	1,108	415	21.4	263	21.5	1,840	157	885,316	6,303,050
1920	6,347	29,016	35,363	8.7	....	1,111	460	20.5	318	21.6	2,299	186	874,752	5,969,355
Central of Georgia.....1921	3,426	3,882	7,308	14.8	750	1,055	502	27.8	509	28.0	1,949	181	327,055	1,715,034
1920	1,448	8,483	9,931	4.3	....	1,067	533	24.6	400	20.3	2,079	(1)	321,764	1,695,292
I. C., (inc. Y. & M. V.)..1921	33,354	28,406	61,760	5.6	3,660	1,513	692	32.3	705	38.5	7,080	162	1,437,486	8,328,697
1920	13,216	44,922	58,138	5.9	....	1,487	730	29.6	805	38.8	7,607	(1)	1,398,444	8,275,137
Louisville & Nashville....1921	29,930	23,817	53,747	16.7	112	1,024	488	32.1	455	24.2	4,870	212	960,785	5,564,836
1920	15,831	28,331	44,162	8.0	116	1,034	515	29.8	594	29.3	5,225	207	946,420	5,617,965
Seaboard Air Line.....1921	9,190	10,944	20,134	12.3	....	1,109	430	21.8	301	22.4	1,715	204	622,652	3,690,522
1920	2,956	19,726	22,682	6.8	....	1,227	529	22.1	344	21.3	2,208	204	602,898	3,619,946
Southern Railway.....1921	23,453	28,283	51,736	4.2	12,431	1,084	464	24.8	351	22.7	2,616	232	1,478,840	9,184,751
1920	11,916	56,905	68,821	2.2	....	1,168	540	22.9	360	20.6	3,565	(1)	1,493,532	9,137,918
Northwestern region:														
C. & N. W.....1921	44,379	28,848	73,227	8.2	4,000	1,054	147	27.1	338	22.7	2,974	222	1,704,861	10,177,895
1920	22,774	62,040	84,814	6.1	....	1,102	479	23.7	317	19.0	3,337	(1)	1,669,938	10,026,406
C., M. & St. P.....1921	36,655	28,254	64,909	8.1	6,600	1,224	525	25.6	368	24.9	2,256	183	1,459,399	8,933,495
1920	19,388	63,473	82,861	5.9	....	1,242	592	25.2	415	22.5	3,236	(1)	1,395,519	8,627,588
C., St. P., M. & O.....1921	3,084	9,568	12,652	12.3	1,223	921	379	24.2	303	20.1	2,220	221	319,713	1,808,052
1920	....	....	15,816	7.9	....	887	405	24.3	306	17.6	2,801	(1)	323,852	1,924,535
Great Northern 1921	41,551	16,273	57,824	9.3	....	1,231	580	27.5	214	11.8	1,551	214	1,001,927	5,974,081
1920	18,853	31,828	50,681	7.1	....	1,267	623	25.3	427	22.8	2,709	(1)	964,594	5,892,626
M., St. P. & S. Ste. M..1921	16,988	9,313	26,301	9.1	1,856	1,114	514	26.7	305	18.1	1,898	151	434,474	2,326,697
1920	6,260	14,568	20,828	6.1	....	950	485	23.4	459	24.5	2,263	187	404,406	2,146,635
Northern Pacific 1921	31,795	16,060	47,855	8.6	2,843	1,395	688	27.7	286	14.3	2,139	167	847,508	5,313,491
1920	13,528	25,821	39,349	6.4	....	1,508	768	27.6	665	31.6	4,095	158	808,647	5,405,704
O. W. R. R. & N. Co....1921	3,603	5,049	8,652	8.1	3,682	1,188	593	27.7	409	20.2	1,611	248	262,446	1,765,459
1920	2,348	7,735	10,083	2.7	....	1,425	749	27.2	565	25.7	2,607	(1)	239,612	1,588,919
Central Western region:														
A., T. & S. Fe.....1921	44,771	22,091	66,862	9.0	11,413	1,361	491	24.2	393	32.0	2,687	174	2,020,229	14,692,947
1920	19,698	51,218	70,916	6.1	....	1,373	586	22.9	514	32.1	3,855	171	1,903,497	14,590,901
Chicago & Alton.....1921	6,693	8,793	15,486	4.2	50	1,229	517	29.0	368	24.0	5,645	232	307,823	1,726,949
1920	2,686	10,842	13,528	2.8	....	1,164	556	28.5	512	26.5	6,852	239	233,400	1,387,226
Chic., R. I. & Pacific....1921	28,142	25,314	53,456	9.4	9,773	1,094	481	25.4	388	24.3	2,706	201	1,332,599	7,898,289
1920	14,408	40,950	55,358	5.9	....	1,076	510	24.7	425	23.1	3,098	(1)	1,309,508	7,668,368
C., B. & Q.....1921	39,459	29,258	68,717	9.1	....	1,512	702	31.5	558	32.2	4,110	190	1,527,745	9,840,101
1920	17,027	56,288	73,315	5.5	....	1,433	720	28.7	596	29.4	4,693	204	1,427,101	9,381,785
Denver & Rio Grande....1921	10,472	5,246	15,718	7.3	1,500	1,196	590	30.9	303	15.5	1,842	264	229,274	1,528,821
1920	7,773	9,051	16,824	4.3	....	1,195	617	31.3	382	18.1	2,486	(1)	222,751	1,473,327
Oregon Short Line.....1921	6,407	6,336	12,743	4.0	5,483	1,292	626	30.3	433	22.2	2,339	169	302,757	2,122,522
1920	3,765	7,929	11,694	3.6	....	1,414	728	29.2	874	40.1	4,353	160	265,566	1,967,100
Southern Pacific.....1921	16,125	26,509	42,634	7.8	1,588	1,418	557	24.2	446	31.6	2,728	177	1,539,513	11,891,023
1920	11,681	30,337	42,018	4.9	....	1,523	703	25.7	669	36.5	4,045	167	1,399,520	11,041,489
Union Pacific 1921	14,659	12,757	27,416	12.5	3,651	1,304	559	26.2	634	40.3	4,811	206	903,411	7,433,730
1920	4,988	15,478	20,466	5.5	....	1,315	640	25.7	1,246	63.4	7,059	197	837,196	6,817,598
Southwestern region:														
Galv., Hbg. & S. A....1921	5,341	22,122	27,463	9.3	2,642	1,270	508	27.7	(1)	(1)	3,804	137	195,928	1,406,343
1920	2,015	23,783	25,798	3.7	....	1,403	633	26.2	(1)	(1)	4,610	123	172,684	1,277,503
Gulf, Colo. & S. Fe.....1921	166	12,054	12,220	4.3	2,816	1,327	578	26.4	410	25.9	2,632	162	196,498	1,185,333
1920	136	14,554	14,690	4.9	....	1,140	518	24.5	283	16.0	2,154	(1)	206,011	1,283,228
Mo., Kansas & Texas....1921	7,404	6,714	14,118	7.5	2,600	1,456	547	25.1	343	27.4	2,832	167	299,710	2,200,864
1920	2,545	11,467	14,012	5.2	....	1,339	586	25.9	392	24.4	3,213	(1)	311,277	2,345,728
M. K. & T. of Texas....1921	235	12,540	12,775	3.8	372	1,145	470	26.2	320	21.6	2,347	174	290,005	1,962,394
1920	232	14,839	15,071	3.9	....	868	370	23.7	193	12.5	1,617	(1)	315,806	2,108,290
Missouri Pacific 1921	23,704	28,465	52,169	6.8	2,371	1,247	565	28.2	405	23.3	2,912	178	945,456	5,549,270
1920	10,612	41,745	52,357	3.6	....	1,264	630	26.8	459	22.3	3,312	(1)	915,561	5,418,048
St. L.-San Francisco....1921	16,162	16,359	32,521	4.7	....	941	387	26.1	319	22.0	2,176	241	789,091	4,490,492
1920	7,921	28,890	36,811	4.0	....	954	452	26.1	353	18.7	2,727	250	764,706	4,529,717
Texas & Pacific.....1921	4,288	9,426	13,714	9.9	....	1,184	459	23.5	401	29.1	2,822	166	322,315	2,121,406
1920	2,843	14,696	17,539	7.3	....	1,050	466	23.2	276	15.7	2,483	231	317,724	2,136,499

[1]Data not available. [2]No passenger service.

report of the Committee on Elimination of Waste in Industry, of which J. Parke Channing is chairman and L. W. Wallace, executive secretary of the council, vice-chairman. The committee has been conducting an assay of waste in principal industries for more than three months and now reports that the results of the assay will be ready in June.

E. E. Hunt, who has been on Mr. Hoover's staff, and who has been identified with the Elimination of Waste in Industry committee since its formation, has been retained to direct the work of that committee until its completion. In submitting the report of the Patents Committee the executive secretary noted the favorable attitude of members of Congress toward pending patent legislation sponsored by the council. Every effort will be made to bring about necessary Patent Office reforms at the present session of Congress.

Other matters discussed by the secretary were petitions of the council for the appointment of an engineer as Assistant Secretary of War, in which favorable action was not obtained, and for the appointment of an engineer to the Interstate Commerce Commission, which is still under consideration. The executive secretary of the council has been appointed on the advisory board to the Board of Surveys and Maps to succeed A. D. Flinn, who represented old Engineering Council.

The next meeting of the council will be held in St. Louis, Mo., on June 3. This meeting will probably be the most important yet held by the society as it will synchronize with the report on the waste assay.

Comparison of Steam and Electric Locomotives

At a meeting of the Franklin Institute held at Philadelphia on April 14 two papers were read on steam and electric motive power. The characteristics of the electric locomotives were discussed by N. W. Storer, general engineer of the Westinghouse Electric & Manufacturing Company, while the characteristics of the steam locomotive were treated by A. W. Gibbs, chief mechanical engineer of the Pennsylvania System.

Mr. Storer stated that he considered it probable that there would gradually be a radical evolution of operating methods in order to utilize the electric locomotive most effectively and discussed some of the factors to be considered in this connection. An important advantage would result from making the speed of passenger and freight trains more nearly uniform as could be done advantageously with electric motive power. On account of its greater reliability the electric locomotive would not impose the same limitations on the length of operating division as the steam locomotive and greater mileage could be obtained from the individual units. Under certain conditions the use of aerial right over track was of great importance. Electrification opens up possibilities in the use of multiple level stations to increase station capacity and improves the operation of stub-end stations by decreasing the number of switching movements. In concluding, Mr. Storer discussed at some length the relative advantages of various types of motors and compared the speed-pull curves with those of typical steam locomotives.

Mr. Gibbs confirmed his remarks to the mechanical problem of transmitting power from the motors to the wheels and the behavior of locomotives as vehicles. He stated that while the transmission of power in electric locomotives seems simple, it really is very difficult and while the electrical features of the motive power were often satisfactory, the mechanical features were troublesome. After discussing briefly the various types of transmission, Mr. Gibbs outlined some of the difficulties encountered in designing locomotives for high speed. In developing the design of Pennsylvania electric passenger locomotives, tests were conducted to determine the riding qualities of electric engines with various wheel arrangements. A section of track was prepared especially for measuring the stresses, a record being obtained by the impression of a steel ball on a steel plate inserted in special ties. The tests showed that a high center of gravity was advantageous and that symmetrical driving wheel arrangements were unstable. Some of the electric engines proved very destructive to the track and as a result of these tests, a design of locomotive with wheel arrangements corresponding to two eight-wheel engines facing in opposite directions and with motors above the wheels was adopted. In conclusion, Mr. Gibbs stated that there was still much to learn with regard to the behavior of electric locomotive as vehicles and further tests should be made to determine the most satisfactory types.

Traffic News

The Department of Domestic Distribution of the Chamber of Commerce of the United States, which has been making a survey of business conditions, reports that by far the largest number of answers to its question as to how the department might help in lowering the cost of merchandising said: "Do something to lower freight rates." Answers were received from some two thousand business men, retailers, wholesalers and manufacturers.

The Postmaster General has filed with the Interstate Commerce Commission an answer to the petition filed by the New England railroads asking for a reexamination of the facts and circumstances surrounding transportation of mail in New England and for an order readjusting the rates since September 1, 1920. The Postmaster General asks that this petition be denied on the ground that such a retroactive order would be in contravention of the rights of the government.

At the annual meeting of the Transportation Club of San Francisco, Cal., the following officers were elected: President, W. B. Hinchman, assistant traffic manager, Tonopah & Tidewater; first vice-president, P. G. Williams, auditor, Associated Oil Company; second vice-president, Harry C. Ewing, commercial agent, Pere Marquette; secretary, E. A. Senneff, general agent, St. Louis-Southwestern; directors, J. J. Shea, bar pilot; J. T. Bate, Pacific coast agent, Missouri, Kansas & Texas; D. M. Swobe, vice-president, McCloud River Railroad; F. C. Lathrop, assistant general passenger agent, Southern Pacific; and M. F. Cropley, assistant general manager, Pacific Steamship Company.

Coal Production

Production of soft coal in the week ended April 16 was marked by a slight but distinct recovery, says the weekly bulletin of the Geological survey. The output is estimated at 6,525,000 net tons, an increase of 416,000 tons over the week preceding and the largest since the second week of March.

Seasonal Coal Rates Proposed

A plan proposed for promoting the "off-season" movement of coal in the early part of the year, in order to avoid shortage and congestion in the fall and winter and to promote a uniform rate of production, is embodied in a bill introduced in Congress by Senator Frelinghuysen providing for seasonal coal rates. The bill was strongly endorsed by the Interstate Commerce Commission and was introduced in the Senate last year; and it was favorably reported by the Senate committee; but it was not acted upon by the Senate. Chairman Clark has appeared before the committee and favored the bill. It provides for a reduction of from 5 to 25 cents a ton from the normal or basic freight rate, from March to July, with corresponding increases in the rates from August to February. The bill was opposed last year by the railroads on the ground that there was a demand for more coal than the railroads could haul anyway and it was opposed by various boards of trade and coal dealers' associations on the ground that it would penalize those industries or communities that necessarily must obtain most of their coal late in the year. This year both the railroads and the coal operators are trying to induce the early purchase of coal. The Interstate Commerce Commission takes the position that it could not authorize seasonal differentials without specific authority of law.

Members of the Senate committee appeared reluctant to have Congress itself legislate so directly on rates as to fix the seasonal differentials itself, but it was informally decided to report a bill authorizing the Interstate Commerce Commission to make an investigation and if it deems it desirable to initiate seasonal rates.

Some negotiations between the Eastern railroads and the shippers of lake cargo coal have been going on for some time, looking to an immediate reduction in coal rates, and it is understood that a number of the railroads are willing to make some reduction. A reduction of 28 cents per ton has been discussed.

Commission and Court News

Interstate Commerce Commission

Port Terminal Charges to Be Investigated

The commission is to investigate the reasonableness of the charges for wharfage, storage, etc., at south Atlantic and Gulf ports at and south of Hampton Roads, Va., and also the propriety of including in the rates of the carriers to and from the ports, the cost of these services. The commission will investigate in a broad and comprehensive way the charges, the nature of the services rendered, the cost thereof and the facilities employed. Comparison will be made with similar charges, costs and services of water terminals not owned or operated by the carriers.

The commission will also inquire into the propriety of absorptions of terminal charges at the ports by the carriers; whether the proper growth and development of any ports are unduly restricted; and whether the free flow of commerce at the ports is unduly impeded.

The proceedings will be set for hearing at places and dates to be determined later.

Personnel of Commissions

The Senate on April 25 confirmed the appointments of B. W. Hooper, Samuel Higgins and W. L. McMenimen as members of the Railroad Labor Board. The committee on interstate commerce had approved the appointments on April 23 though representatives of the maintenance of way employees' organizations had protested the appointment of Mr. McMenimen, who is the second representative of the train service brotherhoods on the board. The Senate has also confirmed the appointment of Col. E. H. Shaughnessy as second assistant postmaster general.

Robert B. Johnson, heretofore in the Bureau of Valuation of the Interstate Commerce Commission, has been appointed signal engineer examiner in the Bureau of Safety of the Commission. Mr. Johnson was born at Leesburg, Va., and was educated at Virginia Polytechnic Institute. His railroad service has been in the signal department on the Southern Railway; as general foreman for the General Railway Signal Company and also as assistant signal engineer for the General Railway Signal Company of Canada. During the world war he served as major of field artillery and while in France was in the 79th division.

Percy W. Jones, heretofore with the Chicago & North Western, has been appointed signal engineer examiner, Interstate Commerce Commission, Washington, for service in the Bureau of Safety. Mr. Jones was born at Reading, Pa., and was graduated from Pennsylvania State College in 1910 in electrical engineering. His railroad service has been on the Pennsylvania lines west of Pittsburgh, the Chicago, Rock Island & Pacific and Chicago & North Western, doing various kinds of work in the signal department. In 1917, 1918 and 1919 he served in the construction division of the United States Army with rank of Lieutenant, being in charge of the electrical and building repair sections at Fort Oglethorpe, Ga. Since the war he has been in the valuation department of the signal engineer's office of the North Western.

President Harding on April 27 sent to the Senate nominations for appointment as members of the Interstate Commerce Commission for E. I. Lewis, chairman of the Public Service Commission of Indiana, and J. B. Campbell of Spokane, Wash., who has for many years represented the intermountain interests in rate litigation as attorney for the Spokane Chamber of Commerce and later as attorney for the Intermediate Rate Association, whose complaint asking a reduction in the rates from the east to the intermountain territory was dismissed by the Interstate Commerce Commission in a decision made public on April 27. Mr. Lewis was appointed for a term expiring December 31, 1925, to succeed J. S. Harlan and Mr. Campbell for one of the new positions on the commission for a term expiring December 31, 1924.

Foreign Railway News

Italian Locomotives for Bulgaria

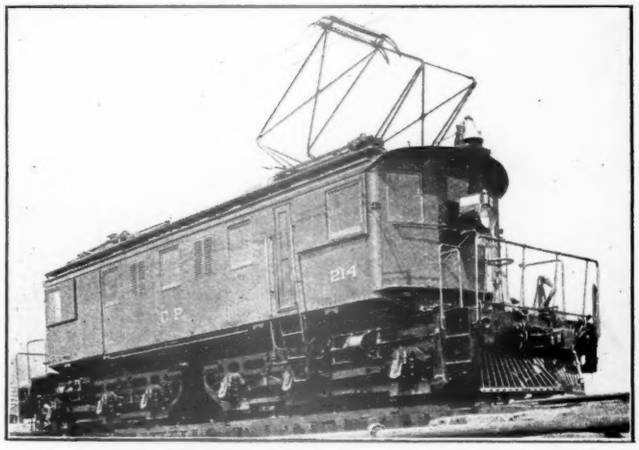
LONDON.

It is reported that the Ansaldo Company, Rome, has made a contract with the Bulgarian government for the construction of 40 locomotives for freight and passenger service.

Electric Locomotives for South America

The first Baldwin-Westinghouse freight locomotive for the Paulista Railway Company, Brazil, S. A., has been completed and tested. The passenger locomotives are nearing completion. Announcement of the proposed electrification of the Paulista Railway was made in the April 23, 1920, issue of the *Railway Age*.

The locomotives are to be used in freight service on the principal broad gage trunk lines of the railroad which runs through



Freight Locomotive for the Paulista Railway

the most prosperous and productive part of the state of Sao Paulo. The freight locomotives each weigh 116 tons and have six driving axles, each equipped with one 280 hp. direct-current motor, arranged for operation with two motors in series on the 3,000-volt line. They are designed to handle trailing loads up to 770 tons over a line having a maximum grade of about 2 per cent. The locomotives are equipped with M. C. B. couplers for testing purposes, but will later be equipped with continental draft gear and arranged for vacuum train brakes.

Railway Situation of India

The annual report of the railway department of the government of India for the year ending March 31, 1920, shows an addition to the total railway mileage of the country of 119, bringing the total up to 36,735. None of the railways are of standard gage. Of 5 ft. 6 in. gage there are 17,990 miles; of 3 ft. 3⅜ in., 15,181 miles; of 2 ft. 6 in., 2,926 miles; and of 2 ft. gage 638 miles.

The net earnings of all the railways totaled $124,729,308 (rupees to dollars at par), or $3,396 per mile. The total capitalization was $1,835,063,748 and the net income represents an earning of 6.8 per cent on the capital outlay. The total passenger train miles during the year was 52,092,000, the total freight train miles was 70,061,000 and the mixed train miles 34,169,000. The average freight haul was 232 miles and the average freight charge per ton mile was 7 mills.

The orders for equipment during the fiscal year included 364 locomotives, 14,157 freight cars and 699 passenger train cars. The railway department is experimenting with central automatic couplers with the view of adopting them as standard if it is found advisable. It is reported that Simplex couplers are being tried on the Great Indian Peninsula Railway. With the use of these couplers and strengthened underframes it has been

found that trains of about twice the ordinary weight can be handled.

The year was marked with strikes and various labor troubles. In many cases wages were advanced as much as 50 per cent over the pre-war rates. The railways gave employment during the year to 711,690 persons. Of these 693,884 were natives, 10,865 were Anglo-Indians and 6,941 were Europeans.

March Exports of Locomotives

Exports of steam locomotives in March totaled 105, valued at $5,317,029. This figure represents a slight increase in number and an enormous increase in value over the February totals. Fifty of these locomotives, valued at $3,570,100, were destined for France. The detailed figures by countries, as compiled by the Bureau of Foreign and Domestic Commerce, follow:

Countries	No.	
France	50	$3,570,100
Canada	3	33,865
Honduras	1	9,522
Mexico	6	83,000
Jamaica	1	5,525
Cuba	6	231,629
Brazil	1	22,000
Venezuela	1	13,425
China	7	344,628
Japan	6	72,000
Philippine Islands	6	289,800
British East Africa	2	14,098
Egypt	15	627,437
Total	105	$5,317,029

March Exports of Car Wheels and Axles

The exports of car wheels and axles in March were valued at $295,336, slightly less than the total for February. The complete figures by countries, as compiled by the Bureau of Foreign and Domestic Commerce follow:

Countries.	
Greece	$40,975
Canada	12,473
Guatemala	509
Nicaragua	123
Panama	2,403
Mexico	9,954
Cuba	1,900
Dominican Republic	1,500
Argentina	28,350
Brazil	64,525
Chile	78,321
Ecuador	892
Peru	7,537
Uruguay	509
China	18,988
British India	900
Japan	12,990
Philippine Islands	11,503
British South Africa	984
Total	$295,336

Locomotive Exports in February

The exports of steam locomotives in February suffered a violent slump. The total is 97, valued at $2,355,295, while similar figures for January show 149, valued at $4,248,147. Mexico was the destination of 31 of these engines, valued at $831,980. Most of the slump can be laid to the falling off of Cuban shipments from 66 in January to 13 in February. The detailed figures by countries as compiled by the Bureau of Foreign and Domestic Commerce follow:

Countries	Number	Dollars
Costa Rica	4	54,909
Honduras	2	33,600
Mexico	31	831,980
Newfoundland and Labrador	6	221,700
Cuba	13	325,180
Virgin Islands of U. S.	1	7,574
Dominican Republic	4	61,265
Brazil	3	97,386
Dutch Guiana	1	6,046
China	7	205,000
Dutch East Indies	1	7,200
Hongkong	1	14,112
Japan	8	60,230
New Zealand	4	21,261
Philippine Islands	7	301,400
British West Africa	1	18,771
British South Africa	3	87,726
Total	97	2,355,295

Amalgamation of Two Great English Companies

A provisional agreement has been made by which the London & North Western Railway will absorb the Lancashire & Yorkshire; and it seems to be understood that there will be no doubt of the approval of the stockholders of the two companies. For several months past, one man, Arthur Watson, has been general manager of both these companies, and they have for many years worked in friendly co-operation. For 12 years past there has been a pool by these two companies and the Midland of certain competitive freight traffic. An amalgamation was proposed fifty years ago, but Parliament then refused its approval.

The main lines of the London & North Western extend from London to Liverpool, Holyhead, Carlisle, Manchester and Leeds. The principal lines of the Lancashire & Yorkshire lie east and west, Liverpool and Southport being prominent western termini and Goole the principal eastern terminus. The aggregate mileage of the London & North Western is 2,066 and of the Lancashire & Yorkshire 601. The smaller road has the densest traffic of any road in Great Britain, its receipts per mile in 1917 being $53,081. Those of the larger road were $38,418. For the year 1920 the following statistics have been published:

	L. & N. W.	L. & Y.
Gross receipts	$195,905,871	$84,787,108
Net income	33,355,633	12,911,591
Dividends on preferred stock	8,969,660	5,174,811
Dividends on common stock	15,640,739	4,120,527

Note—Pounds shown as dollars at par value.

For the four weeks ending January 2, 1921, the government has published the following items:

	L. & N. W.	L. & Y.
Freight ton miles	163,788,686	44,141,901
Average haul, miles	41.34	24.91
Average freight train load, tons	139.07	122.77
Ton miles per mile of road	80,407	74,188
Passengers carried	8,089,634	6,454,477

The Lancashire & Yorkshire has been one of the most enterprising of English companies, Sir John A. F. Aspinall, its general manager for about twenty years, up to about 1908, being one of the distinguished railroad engineers of the country. The company owns a large fleet of steamers plying between Goole and the Continent.

French Railway Deficits

The railways in France, in common with those of almost every other country, are suffering heavy deficits. According to the latest statistics, which have been supplied by the Bureau of Railway Economics, revenues fell short of expenditures at the end of 1919 by $260,878,100 (francs to dollars at par). In fact, for each successive year since 1913, the French railways have been writing their net returns in red ink. The deficits remained within relatively moderate limits during the first years of the war, increased quickly from the beginning of 1917, then made a formidable leap in 1919. The deficits of the French railways from 1913 to 1919 are shown below:

Year	Deficits All Roads
1913	$15,188,900
1914	54,095,300
1915	58,517,600
1916	53,094,300
1917	77,026,300
1918	101,595,200
1919	260,878,100

Freight rates have been increased approximately 140 per cent since the war, with a corresponding increase in passenger rates of 55, 50 and 45 per cent. The railways cannot hope to look for a great measure of further relief by asking for an additional increase in rates. Although traffic is growing, the French roads have by no means begun to resume their normal peace time standards. Only July 1, 1920, the number of loaded cars was 35,273, although in March, April and May it was over 36,000, the normal peace time standard being from 57,000 to 67,000 cars daily.

The French Minister of Public Works hopes to bring about some relief by reducing costs of operation. As in the United States the wage item appears to absorb the greatest percentage of operating revenues, with the cost of fuel running second. If the abnormal price of coal decreases, this itself may be sufficient to convert the aggregate deficit into a surplus, otherwise relief will have to be sought which may necessitate either a reduction in wages or a transference of the deficit to the tax payer. On January 1, 1913, employees on the French railways numbered 356,789; by January 1, 1920, this number had increased to 460,947, or 29 per cent. Their compensation, which in 1913 amounted to $148,525,580, has increased today to $637,706,160, or an increase of 329 per cent. The annual compensation per man before the war of $552 has reached $1,744, or an increase of 216 per cent. The introduction of the eight-hour day alone was responsible for an increased expenditure of over $150,000,000 annually.

Equipment and Supplies

Locomotives

THE UNION PACIFIC is inquiring for 65 locomotives.

MITSUI & Co., New York, are inquiring for prices on material for the construction of 3 Pacific type locomotives, for the South Manchurian Railway.

The CHILIAN STATE RAILWAYS will open bids on July 6, in Santiago, Chili, for 20 Mikado type locomotives of 1.676 meter gage, also for 10 Mikado type locomotives of one meter gage. Other information can be obtained at the New York City office of the company, 141 Broadway.

NATIONAL RAILWAYS OF MEXICO.—Francisco Perez, director general of the National Railways of Mexico, on a recent visit to the United States, bought 91 locomotives from the Illinois Central, for the National Railways. These lines are not in the market for any additional locomotives at the present time.

Freight Cars

The CHILIAN STATE RAILWAYS will open bids July 6, in Santiago, Chili, for 100 Hart convertible cars of 45 tons capacity, 200 box cars of 30 tons capacity, 300 flat cars of 30 tons capacity and 20 refrigerator cars of 30 tons capacity, all to be of 1.676 meter gage.

Passenger Cars

The CHILIAN STATE RAILWAYS will open bids on July 6, in Santiago, Chili, for 80 coaches of 1.676 meter gage, also for 2 sleeping coaches, 2 dining cars, 2 first-class coaches, 2 third-class coaches and 2 mail cars, all of one meter gage.

Iron and Steel

The KANAWHA & MICHIGAN has ordered 1,500 tons of rails from the United States Steel Corporation.

THE MISSOURI, KANSAS & TEXAS has ordered four through riveted truss spans, requiring a total of 680 tons of steel, from the Lackawanna Bridge Company, Buffalo, N. Y.

MITSUI & Co., New York, are inquiring for 5,000 tons of 75 lb. rail and the necessary splice bars for the Japanese Government Railways, also for 1,560 tons of steel for bridges, for use in Japan.

Miscellaneous

The CHICAGO & NORTH WESTERN is inquiring for 400 tons of iron bars for delivery May 3.

THE NEW YORK CENTRAL is asking for bids until 12 o'clock noon May 5, for a minimum of 200,000 gal. and a maximum of 800,000 gal. of asphaltum base fuel oil, with gravity of 14-16

Signaling

THE UNION PACIFIC has ordered from the General Railway Signal Company, to be installed by the railroad company at a tunnel between Altamont, Wy., and Aspen, two electric interlocking machines with illuminated track diagrams: one machine to have 20 working levers and the other 21.

"SUMMER TOURS" is the title of an attractive booklet now being distributed by the Chicago & North Western and the Union Pacific, describing 33 personally escorted tours to Yellowstone and Rocky Mountain National Parks to be made this summer. Each tour covers two weeks and provides over 500 miles of automobiling.

Supply Trade News

C. B. Cole, formerly manager of the Chicago territory of the Union Twist Drill Company, has joined the sales staff of the **Tool Sales & Engineering Company** at Chicago.

The Simmons-Boardman Publishing Company, publishers of the *Railway Age* and other publications, will, effective May 1, move their Cleveland, Ohio, office to 4300 Euclid avenue.

The Railway Materials Company announces that on May 1 its general offices will be removed from the Railway Exchange to suite 1900 Wrigley building, 400 North Michigan avenue, Chicago.

The offices of the Official Guide, published by the **National Railway Publication Company,** have been removed from 75 Church street to larger quarters at 424 West Thirty-third street, New York City.

A. H. Weston, formerly sales engineer, Lackawanna Steel Company, is now associated with the **American Chain Company,** Reading specialties division, with headquarters at 1054 Grand Central Terminal, New York City.

The W. T. Dunn Co., 10 High street, Boston, Mass., has been appointed New England sales agent for **B. M. Jones & Co., Inc.,** 192 Chambers street, New York, importer of Mushet and Titanic tool steels, and Taylor's best Yorkshire iron.

J. J. Connors, until recently superintendent of motive power of the Denver & Salt Lake, has formed a connection with the **Lowe Brothers Company,** Dayton, Ohio, as railway representative, with office at 1243 Monadnock building, Chicago, Ill.

Russell B. Reid, for several years assistant sales manager of the Edward R. Ladew Company, has been made manager of sales for the **Sharon Pressed Steel Company,** Sharon, Pa. Mr. Reid will have his headquarters at 66 Broadway, New York City.

The offices of the Pocket List of Railroad Officials and the official Railway Equipment Register, published by the **Railway Equipment and Publication Company,** have been removed from 75 Church street to larger quarters at 424 West Thirty-third street, New York.

F. W. McIntyre has been appointed general sales manager of the **Reed-Prentice Company** and the **Whitcomb-Blaisdell Machine Tool Company,** Worcester, Mass., also the **Becker Milling Machine Company,** Hyde Park, Boston, succeeding **J. P. Ilsley,** who has resigned to go with the Taylor Steel Construction Company, New York.

Fred H. Dorner, Wells building, Milwaukee, Wis., has been appointed sales representative for the **American Spiral Spring & Manufacturing Company** in Wisconsin and the northern peninsula of Michigan. **McCreery & Taussig,** Railway Exchange building, St. Louis, Mo., have been appointed sales representatives for the company in Missouri and southern Illinois.

H. M. Davison, who was from 1903 to 1919 with the Hayward Company, New York, and for two years just past was general sales manager for the Ohio Locomotive Crane Company, Bucyrus, Ohio, has again become associated with the **Hayward Company** and will hereafter be connected with the management of that company. Among other duties he will have the general management of sales.

Sidney G. Johnson, formerly vice-president and general sales manager, of the General Railway Signal Company, has been appointed eastern sales representative for the **Hazard Manufacturing Company,** Wilkesbarre, Pa., to look after its

interests in rubber insulated railroad signal wire and kindred products, with the railroads in eastern territory Mr. Johnson's office is at room 626, 30 Church street, New York City.

The Multiple Storage Battery Company, of New York City, has reorganized with **Herbert G. Clopper,** formerly of the New Jersey Zinc Company, elected president and treasurer; **Norman D. Sturges** remains as vice-president and general manager, and **Jasper Bayne** retains the position of secretary. The board of directors has been increased to include **Howard Bayne,** vice-president of the Columbia Trust Company, New York City, and **L. M. De Vausney,** vice-president of the Seaboard National Bank, New York City.

Crane Company

The Crane Company showed net income of $8,969,311 for the year 1920, after writing down its inventory $5,617,000. This compares with net income for the previous year of $11,363,051. Only $1,917,000 of the inventory written off was charged to 1920 earnings, the balance being charged against reserve. In 1920, $27,061,000 of accumulated surplus was distributed as a stock dividend.

The statement follows:

Income Account	1920	1919
Net after dependencies, taxes, etc.	$8,649,624	$11,248,242
Income from investments	685,263	528,829
Total net earnings	9,334,887	11,777,071
Interest and premium on bonds	365,576	414,019
Net income	$8,969,311	$11,363,051

Obituary

Willard L. Candee, formerly for about 20 years previous to 1915, president of the Okonite Company, Passaic, N. J., died on April 24 of heart failure in New York City, while on an automobile trip from Long Island. He was born 70 years ago at Yonkers, N. Y., and was one of the pioneer men in the telephone field, also in the electrical lighting field. He was associated with Charles A. Cheever in organizing the first telephone company in New York City, in the early eighties. In 1884, with Mr. Cheever, he organized the Okonite Company for manufacturing insulated wires and cables for electrical purposes, and about ten years later he became president of that company. Mr. Candee remained as president until he retired from active business five or six years ago.

W. L. Candee

Trade Publications

TRACK WORK.—The Ramapo Iron Works, Hillburn, N. Y., has recently issued a complete new catalogue of its products comprising about 500 pages. The book is bound in loose leaf form and is devoted to sectional, diagrammatic and halftone views of switch-stands, switches, frogs, crossings, guard rails and accessories in heavy and light equipment.

HORIZONTAL RETURN TUBULAR BOILERS.—The Bigelow Company, New Haven, Conn., has reprinted in a separate book matter relating to their return tubular boilers appearing in the company's regular catalogue. This includes a general description of this type of boiler, detailed instruction for setting, illustrations of boilers and furnaces and comprehensive tables of data.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company has awarded the contract for a craneway building at Topeka, Kan., to Jerome Moss, Chicago, instead of to Joseph E. Nelson & Son, Chicago, as was announced in the *Railway Age* of April 15 (page 958).

ATCHISON, TOPEKA & SANTA FE.—This company, which was noted in the *Railway Age* of April 15 (page 958), as co-operating with the railroad Y. M. C. A. at Topeka, Kan., in planning additions and improvements to the Y. M. C. A. building at Topeka, at a cost of approximately $25,000, is now accepting bids for this work.

ATCHISON, TOPEKA & SANTA FE.—This road, which was noted in the *Railway Age* of March 11 (page 574), as contemplating the construction of a blacksmith shop at San Bernardino, Cal., with dimensions 80 ft. by 307 ft., has awarded the contract for this work to Joseph E. Nelson & Sons, Chicago. The estimated cost is $150,000 and construction will commence at once.

BALTIMORE & OHIO.—This company will replace its present double-deck, single track bridge across the Allegheny River at Foxburg, Pa. The new structure will consist of three double-deck, riveted, single track trusses, each 173 ft. 6 in. long. The contract for the fabrication and erection of this structure has been awarded to the Bethlehem Steel Bridge Corporation.

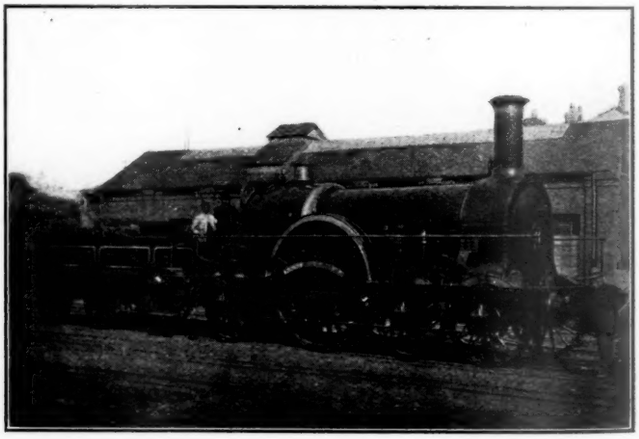
CHICAGO & NORTH WESTERN.—This company has awarded contracts for the construction of concrete bridges throughout the system to the Widell Company, Mankato, Minn.; S. G. Cool, Manitowoc, Wis.; Peppard & Burrill, Minneapolis, Minn., and White & Duffy, Milwaukee, Wis. The total cost of the work will be approximately $200,000.

CHICAGO UNION STATION COMPANY.—This company will shortly accept bids for a viaduct on Van Buren street between Canal street and the Chicago River.

ILLINOIS CENTRAL.—This company, which is accepting bids for the construction of a viaduct over McLemore avenue, Memphis, Tenn., will award the contract for this work about May 5.

MAINE CENTRAL.—This company will build an 8-span steel bridge with concrete piers over the Kennebec river at Norridgewock, Me. T. Stuart and Sons, Newton, Mass., have been awarded the contract for the foundations and the Bethlehem Steel Bridge Company for the steel. The cost of the work is estimated at approximately $125,000.

TEXAS MIDLAND.—The Interstate Commerce Commission has issued a certificate authorizing the construction of an extension from Commerce to Greenville, Texas.



A Seven-foot Gage Locomotive on the Great Western, England, in 1880.

Railway Financial News

ALASKA ANTHRACITE RAILROAD.—*Asks authority to issue bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $1,500,000 of 6 per cent, 20-year bonds to be sold at 90, the proceeds to be used in completing the extensions of its property in Alaska.

ATCHISON, TOPEKA & SANTA FE.—*Annual Report.*—The income statement for the year ended December 31, 1920 compares with the preceding year as follows:

	1920	1919
Operating income, four months ending December 31, 1920	$12,983,725	.....
Compensation under federal control	.....	$44,615,087
Compensation, January and February	7,699,532	.....
Guaranty, six months ending August 31, 1920	22,553,225	.....
Other income	9,842,116	15,100,116
Gross income	$53,078,597	$59,715,203
War tax accruals	2,608,497	3,373,271
	$49,650,372	$54,752,917
Interest on bonds, including accrued interest on adjustment bonds	12,015,621	11,654,259
Dividends:		
Preferred (5 per cent)	$6,208,685	$6,208,685
Common (6 per cent)	13,441,110	13,351,695
Surplus carried to profit and loss	$17,881,460	$23,438,819

The annual report of the Atchison, Topeka & Santa Fe will be reviewed editorially in an early issue.

BOSTON & MAINE.—*Annual Report.*—A review of this company's annual report for 1920 appears on another page of this issue.

CHESAPEAKE & OHIO.—*Authorized to pledge bonds.*—This company has been authorized by the Interstate Commerce Commission to pledge and repledge from time to time until otherwise ordered all or part of $487,000 of general mortgage 4½ per cent gold bonds of 1892 held in the applicant's treasury as collateral security for short term notes.

CHICAGO, BURLINGTON & QUINCY.—*Bond offering.*—Announcement was made by J. P. Morgan Co. on Monday, following the receipt of news that the issue had been approved by the Interstate Commerce Commission, to the effect that a national syndicate of banking institutions and investment houses in New York, Boston, Philadelphia, Pittsburgh, Chicago, Cincinnati, Detroit, Cleveland, Minneapolis, St. Paul and St. Louis would offer the following day $230,000,000 Northern Pacific-Great Northern joint 15-year 6½ per cent convertible bonds to the public at 96½ and interest, to yield about 6⅞ per cent.

Details of the issue are summarized as follows from the letter to the bankers prepared by Howard Elliott, chairman of the Northern Pacific, and Louis W. Hill, chairman of the Great Northern:

The joint fifteen-year 6½ per cent convertible bonds are to be the direct and joint obligations of the Northern Pacific and of the Great Northern Railway companies, and are to be secured by a pledge of 1,658,674 shares (approximately 97 per cent of the outstanding stock) of the Chicago, Burlington & Quincy Railroad Company (which percentage of stock has heretofore constituted the sole collateral security for the maturing Burlington joint 4s), and in addition by $66,000,000 in mortgage bonds of the two obligor companies, the deposited collateral being valued at an amount in excess of 120 per cent of the principal amount of joint 6½ per cent bonds to be issued.

The joint 6½ per cent bonds may be converted, par for par, without charge, at the option of the holder, at any time (upon presentation not later than fifteen days before maturity or earlier redemption) into 6 per cent refunding and improvement mortgage bonds (Series B) of the Northern Pacific Railway Company, due 2047 (callable after fifteen years, at the company's option, at 110 per cent and accrued interest), or into 7 per cent fifteen-year general mortgage bonds (Series A) of the Great Northern Railway Company, due 1936 (with no option of prior redemption), or into bonds of both issues in any ratio between the two which the holder of the joint 6½ per cent bonds may desire, but not more than $115,000,000 of either of such mortgage bonds will be issuable upon such conversion.

Such Northern Pacific bonds are, in the opinion of counsel, a legal investment for savings banks and trust funds in New York, Massachusetts, Connecticut and Vermont. Both such Northern Pacific bonds and such Great Northern bonds are, in the opinion of counsel, a legal investment for life insurance companies in the State of New York.

Special features of the financing are that discount will be allowed at 6½ per cent a year on the principal sum of the bonds from the date of payment to July 1, from when interest on the bonds will accrue, and that the Burlington joint 4s, which mature on July 1, 1921, with final coupon attached, will be accepted in payment at 100 and accrued interest to date of payment on allotments, scheduled for on or about May 16.

The decision of the Interstate Commerce Commission approving the issue will be found in the article entitled "Great Northern-Northern Pacific Bonds Approved" which appears on another page.

CHICAGO, MILWAUKEE & ST. PAUL.—*Annual Report.*—The corporate income account for 1920 compares with 1919 as follows:

	1920	1919
Railway operating income March 1 to December 31, inclusive:		
Railway operating revenues	$141,643,202	.....
Railway operating expenses	134,087,552	.....
Net railway operating revenue	7,555,650	.....
Railway tax accruals	6,179,992	.....
Railway operating income March 1 to December 31, inclusive	1,372,519	.....
Rents—received	912,536	$183,313
Interest on other securities and accounts	1,502,736	1,756,393
Amount accrued under guaranty provision	22,250,811	.....
Compensation, January and February	4,640,721	.....
Compensation accrued	.....	27,945,820
Total other income	29,755,776	3,787,714
Gross income	31,128,295	31,733,534
Interest on funded debt	17,593,581	16,690,835
Interest on unfunded debt	2,240,811	.....
Hire of equipment	3,874,141	.....
Rents—paid	1,171,834	92,609
Total deductions	26,762,224	24,090,489
Net income	4,366,071	7,643,045

The annual report of the Chicago, Milwaukee & St. Paul will be reviewed editorially in an early issue.

DENVER & RIO GRANDE WESTERN.—*Directors Elected.*—At the first meeting of stockholders at Denver, Col., on April 22 of this company which was organized to take over the properties of the Denver & Rio Grande sold at foreclosure on November 20, 1920, Alvin W. Krech, of New York, was elected chairman of the board. Mr. Krech is also chairman of the board of the Western Pacific Railroad Company and president of the Equitable Trust Company of New York, which holds a $30,000,000 mortgage on the property.

The directors elected, all of them from New York, were: F. W. M. Cutchen, I. de Bruyn, John B. Dennis, Frederick H. Ecker, A. M. Hunt, Alvin W. Krech, John B. Marsh, Robert W. Martin, George Welwood Murray, Lyman Rhoades, John Y. Robbins and R. B. Young.

After the regular meeting a special meeting of the stockholders amended the articles of incorporation of the new company to make the $1,000,000 issue of common stock of no par value. The original incorporation filed with the Secretary of State had fixed a par value of $50 a share. The change was made to conform with a law passed by the last Colorado Legislature.

The comment on the election of J. H. Young as president of the Denver & Rio Grande Western appears on another page of this issue.

FERNWOOD, COLUMBIA & GULF.—*Authorized to issue bonds.*—This company has been authorized by the Interstate Commerce Commission to issue and sell $200,000 of refunding mortgage bonds.

FREDERICKSBURG & NORTHERN.—*Authorized to Issue Promissory Note.*—This company has been authorized by the Interstate Commerce Commission to issue, under date of January 1, 1921, its promissory note for $36,936, bearing interest at 6 per cent per annum, payable to the order of J. L. Browne to cover certain advances made to the applicant.

KINDER & NORTH WESTERN.—*Asks Permission to Abandon Line.*—This company has applied to the Interstate Commerce Commission for a certificate authorizing the abandonment of 6 miles of its line from Bullard to Vizard, La., and the abandonment of operation as a common carrier of 8 miles from Vizard to Emad, proposed to be sold for use as a logging road.

LOS ANGELES & SALT LAKE.—*Asks authority to issue notes.*—This company has applied to the Interstate Commerce Commission for authority to issue $2,500 of one year, 7 per cent promissory notes.

NEW YORK, ONTARIO & WESTERN.—*Annual Report.*—The annual report for the calendar year 1920 shows the following corporate income account as compared with 1919:

	1920	1919
Compensation from U. S. Govt.	.....	$2,103,589
Interest on deferred payments of above.	.....	56,513
Compensation, January and February	$350,598	.....
Net railway operating income, March 1 to December 31	355,952	.....
Estimated partial payment on account of guaranty deficit in net railway operating income, period March 1 to September 1	795,950	.....
Miscellaneous rent income	6,673	4,815
Income from securities and accounts	843,163	316,760
Income from sinking and other reserve funds	3,217	960
Equipment rents—net	23,262	.....
Gross income	$2,378,815	$2,482,642
Rent for leased roads	200,752	197,708
Interest on funded debt	1,176,430	1,185,115
Total deductions from gross income, inc. other	1,523,477	1,548,668
Net income	$855,339	$933,974
Balance for year	$805,890	$900,680

The operating revenues and expenses in detail and the principal traffic statistics for 1920 compare with 1919 as follows:

OPERATING REVENUES	1920	1919
Merchandise freight	$3,115,005	$2,493,348
Coal freight	4,885,788	3,909,251
Milk	1,167,585	1,093,873
Passenger	3,098,508	2,697,357
Total operating revenues	$13,154,689	$10,910,027
OPERATING EXPENSES		
Maintenance of way and structures	$2,249,095	$1,742,907
Maintenance of equipment	3,449,277	2,657,554
Traffic	145,718	108,569
Transportation	6,279,307	4,811,278
General expenses	355,750	320,783
Total operating expenses	$12,684,317	$9,841,748
Net revenue from railway operations	$470,372	$1,068,279
Railway tax accruals	457,040	401,809
Railway operating income	$10,714	$666,445
PASSENGER TRAFFIC		
Number of revenue passengers	1,925,897	1,761,870
Number of passengers carried one mile	98,911,515	91,369,678
Average distance carried (miles)	51.36	51.86
Average receipts per passenger mile (cents)	3.133	2.952
MILK TRAFFIC		
Number of tons carried of milk earning revenue	152,835	151,662
Number of tons carried one mile	27,131,632	26,476,451
Average distance haul of one ton	177.52	174.58
Average receipts per ton per mile	4.303	4.131
FREIGHT TRAFFIC		
Number of tons carried of freight earning revenue	5,279,972	5,165,934
Number of tons carried one mile	691,073,698	662,704,487
Average distance haul of one ton	130.89	116.67
Average receipts per ton per mile	1.158	1.062

The report, signed by President John B. Kerr, says:

The financial results of operation since September first on all roads have been disappointing for causes that are well known, but the results on our line compare favorably with those of the great majority of the carriers.

PENNSYLVANIA.—*Dividend Reduced.*—This company on April 27 reduced its quarterly dividend from 1½ to 1 per cent.

The decrease is a quarterly reduction of one half of 1 per cent. This is the first time in twenty-two years the Pennsylvania has reduced the annual dividend basis below 6 per cent. Since 1899 it has paid 6 per cent annually, with the exception of 1906 when it paid 6½ per cent, and in 1907 when it paid 7 per cent. For seven years prior to 1899, the dividends were 5 per cent.

RENSSELAER & SARATOGA.—*Authorized to Issue Bonds.*—This company has been authorized by the Interstate Commerce Commission to issue $2,000,000 of first mortgage 6 per cent, 20 year, gold bonds and to deliver them to the Delaware & Hudson Company in accordance with a certain lease. The Delaware & Hudson was authorized to guarantee the bonds and to sell them at par to pay off a like amount of bonds of the Rensselaer & Saratoga which mature on May 1.

TEXAS MIDLAND.—*Authorized to issue bonds.*—This company has been authorized by the Interstate Commerce Commission to issue $500,000 of first mortgage 4 per cent, 30-year refunding bonds and to sell them at not less than par.

TOLEDO, ST. LOUIS & WESTERN.—*Referees Report on Just Compensation.*—The board of referees appointed by the Interstate Commerce Commission has issued a report finding that the government should pay $1,113,486 as just compensation for the use of the company's property during the period of Federal control for each year and pro rata for the fraction of the year comprised in that period. This represents $1,022,468 as the average annual operating income for the three year test period, and three additional items to which the referees say the company is entitled in addition to the standard return. The company had claimed $1,500,000 a year.

WABASH.—*Annual Report.*—The corporate income account for 1920 compares with 1919 as follows:

	1920	1919	Increase or decrease
Operating revenues:			
Freight	$43,324,700	$35,255,548	$8,069,152
Passenger	11,218,051	10,143,356	1,074,695
Total operating revenues	59,982,282	48,847,086	11,135,197
Operating expenses:			
Maintenance of way and structures	10,541,360	8,086,880	2,454,480
Maintenance of equipment	14,735,801	9,358,676	5,377,125
Traffic	1,169,383	657,109	512,274
Transportation	30,023,953	24,610,615	5,413,338
General	1,999,814	1,597,569	402,245
Total operating expenses	58,859,395	44,587,030	14,272,366
Net operating revenue	1,122,887	4,260,056	—3,137,169
Tax accruals	1,574,473	1,445,726	128,747
Total operating income	Def. 454,940	2,805,154	—3,260,094
Total non-operating income	863,291	728,708	134,584
Gross income	408,351	3,533,861	—3,125,510
Total deductions from gross income	7,778,178	6,082,812	1,695,366
Net income	Def. 7,369,827	Def. 2,548,951	—4,820,876
Compensation accrued under federal control	971,135	.....	.....
Guaranty	8,063,775	.....	.....
Total	9,034,910	.....	.....
Credit income balance transferred to profit and loss	1,983,943	.....	.....

The annual report of the Wabash will be reviewed editorially in an early issue.

Guaranty Certificates

The Interstate Commerce Commission has issued the following certificates for partial payments on account of the six months' guaranty for last year:

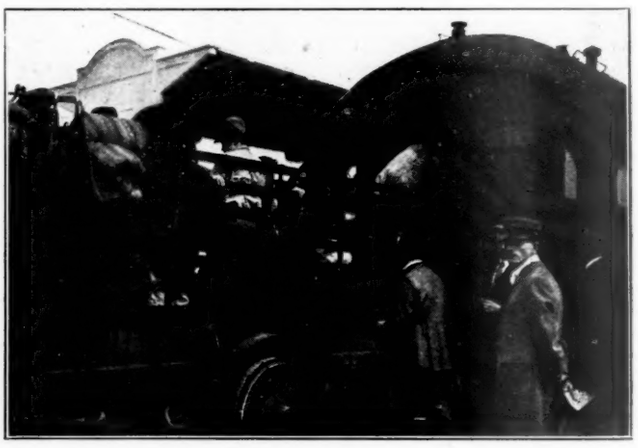
Toledo, Peoria & Western	$175,000
Buffalo & Susquehanna	100,000
Michigan Central	650,000
Tennessee Central	80,000
Delaware & Hudson	500,000
Georgia Southern & Florida	130,000
Chicago, Indianapolis & Louisville	125,000

Dividends Declared

Keokuk & Des Moines—Preferred, 3 per cent, payable May 5 to holders of record April 26.

Reading Company—First preferred, 50 cents, quarterly, payable June 9 to holders of record May 24.

Pennsylvania.—1 per cent quarterly, payable May 31 to holders of record May 2.



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Deportation of Undesirables in San Francisco

Railway Officers

Executive

Edward S. Jouett, assistant general counsel of the Louisville & Nashville, has been elected vice-president and general counsel, with headquarters at Louisville, Ky., effective April 21, succeeding Henry L. Stone, resigned.

B. B. Greer, vice-president of the Chicago, Milwaukee & St. Paul, has been elected president of the Des Moines Union Railroad in addition to his other duties, succeeding F. C. Hubbell, of Des Moines, who has resigned.

Financial, Legal and Accounting

J. M. Gayle has been appointed auditor of the Beaver, Meade & Englewood, with headquarters at Oklahoma City, Okla.

Operating

Roger T. Taylor, assistant general superintendent of the Northern Pacific, with headquarters at Livingston, Mont., has been appointed trainmaster, with the same headquarters, effective April 15.

Walter D. Pearce, trainmaster of the Northern Pacific, with headquarters at Forsyth, Mont., has been appointed supervisor of bridges and buildings, with headquarters at Glendive, Mont., effective April 15.

A. L. Soule has been appointed assistant to the general manager of the Atchison, Topeka & Santa Fe with headquarters at Topeka, Kan., effective April 25, succeeding F. J. Mackie, assigned to other duties.

F. J. MacKie, assistant to the general manager of the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan., has been appointed superintendent of the Plains division, with headquarters at Amarillo, Tex., effective April 20. Mr. MacKie succeeds **O. J. Ogg,** who has been transferred to the western division, with headquarters at Dodge City, Kan., succeeding **D. S. Farley,** who has been promoted to assistant general manager.

ROCK ISLAND CONSOLIDATES DIVISIONS

The Chicago, Rock Island & Pacific has consolidated divisions, effective May 1, as follows: That part of the Minnesota division between Cedar Rapids and St. Paul-Minneapolis, and between Vinton, Iowa, and Iowa Falls, has been consolidated with the Cedar Rapids division, the consolidated division to be known as the Cedar Rapids-Minnesota division. That part of the Minnesota division between Manly, Iowa, and Short Line Junction has been consolidated with the Des Moines Valley division. The Colorado division has been consolidated with the Nebraska division, and is to be known as the Nebraska-Colorado division. The St. Louis division has been consolidated with the Kansas City terminal division, and is to be known as the St. Louis-Kansas City division. The Louisiana division has been consolidated with the Arkansas division, and is to be known as the Arkansas-Louisiana division. The Indian Territory division has been consolidated with the Panhandle division, and is to be known as the Panhandle-Indian Territory division. The Amarillo division has been consolidated with the El Paso-Mexico division, the new division to be called the El Paso-Amarillo division.

Coincident with these consolidations, appointments and transfers have been made as follows: **H. R. Saunders,** superintendent, with headquarters at El Reno, Okla., has been transferred to the Chicago Terminal division, with headquarters at Chicago. Mr. Saunders succeeds **C. T. Ames,** who has been appointed trainmaster, with headquarters at Des Moines, Iowa. Mr. Ames succeeds **W. E. Warren,** who has been transferred to Cedar Rapids, Iowa. **A. L. Haldeman,** superintendent, with headquarters at Manly, Iowa, has been transferred to Cedar Rapids, succeeding **E. D. Hungerford,** who has been appointed assistant superintendent, with headquarters at Minneapolis, Minn. Mr. Hungerford succeeds **F. M. Patt,** who has been appointed trainmaster of the Colorado division, with headquarters at Colorado Springs, Colo. Mr. Patt succeeds **O. F. Young,** who has been asigned to other duties. **H. E. Allen,** superintendent, with headquarters at Fairbury, Neb., has been transferred to Estherville, Iowa, succeeding **C. E. Green,** who has been appointed trainmaster, with headquarters at Cedar Rapids. Mr. Green succeeds **W. L. Pauley,** retired. **F. N. Tinsman,** superintendent, with headquarters at Colorado Springs, Colo., has been transferred to Fairbury, Neb., succeeding Mr. Allen. **J. A. McDougal,** superintendent, with headquarters at El Reno, Okla., has been appointed superintendent of the Oklahoma division, with the same headquarters, succeeding H. R. Saunders. **D. Van Hecke,** superintendent, with headquarters at Haileyville, Okla., has been transferred to El Reno, succeeding Mr. McDougal. **H. P. Greenough,** superintendent of the El Paso-Mexico division, with headquarters at Dalhart, Tex., has been appointed superintendent of the El Paso-Amarillo division, with the same headquarters. **C. H. Hubbell,** superintendent, with headquarters at Amarillo, Tex., has been appointed trainmaster, with the same headquarters. **G. W. Rourke,** superintendent of the Kansas City Terminal division, with headquarters at Kansas City, Mo., has been appointed superintendent of the Kansas City division, with the same headquarters. Mr. Rourke succeeds **H. E. Correll,** who has been appointed trainmaster, with headquarters at Eldon, Mo. **J. S. Jones** has been appointed trainmaster, with headquarters at Kansas City, Mo. **A. E. Walker,** superintendent of the Arkansas division, with headquarters at Little Rock, Ark., has been transferred to the Arkansas-Louisiana division, with the same headquarters. Mr. Walker, succeeds **J. G. Bloom,** who has been appointed division engineer, with headquarters at Fairbury, Neb.

Traffic

D. H. Hoops, division freight and passenger agent of the Chicago & North Western, with headquarters at Chicago, has been promoted to general freight agent, effective May 1. Mr. Hoops was born in Chicago and entered railroad service in 1885 as a junior clerk in the accounting department of the Chicago & North Western. His entire railroad career has been spent in the service of that company. He was transferred to the traffic department in 1888 and has served continuously since then in that department. He was made chief clerk to the general freight agent in 1895, and in 1898, was promoted to general agent, with headquarters at Des Moines, Iowa. He was shortly transferred to Chicago as acting general agent in the freight department, and in 1900 was promoted to general agent in the passenger department, with the same headquarters. In 1906, he was transferred to Denver as general agent in the freight and passenger departments. In 1911, he was transferred as general agent, freight department, at Denver. Mr. Hoops was promoted to division freight and passenger agent, with headquarters in Chicago, as stated above, in 1917.

D. H. Hoops

John P. Williams, general agent, freight department, of the Chicago & North Western, with headquarters at Chicago, has been promoted to division freight and passenger agent,

with the same headquarters. **H. S. Bischoff,** general agent, with headquarters at Salt Lake City, Utah, has been transferred to Chicago, succeeding Mr. Williams. **N. O. Browne** succeeds Mr. Bischoff.

U. G. Soule has been appointed commercial agent of the Southern, with headquarters at Chicago, effective March 15.

A. W. Gill has been appointed assistant to the freight traffic manager of the Southern, with headquarters at Cincinnati, Ohio, effective April 15, succeeding E. M. Lane, deceased.

R. T. Powers has been appointed commercial agent of the Winston-Salem Southbound Railway, with headquarters at Cincinnati, Ohio. **J. H. Swaim** has been appointed commercial agent, with headquarters at Winston-Salem, N. C.

Samuel F. Miller, general freight agent of the Chicago & North Western, with headquarters at Chicago, has been promoted to assistant freight traffic manager, effective May 1, succeeding the late E. D. Brigham. Mr. Miller was born at Wenona, Ill., on January 17, 1867, and entered railway service on July 21, 1881, as a telegraph operator for the Chicago & North Western. His entire railway career has been spent in the service of this company. In 1884, while serving as cashier, he was made station agent and was employed in that capacity at various points on the line in Wisconsin until 1890, when he was promoted to traveling agent. In 1896 he was made general agent, and after five years' service in this capacity he was promoted to assistant general freight agent, with headquarters at Chicago. From 1906 to 1912, he served as general freight and passenger agent of the Nebraska and Wyoming division, with headquarters at Omaha, Neb. He was promoted to general freight agent in September, 1912, and held that position continuously up to the time of his recent promotion.

S. F. Miller

Mechanical

Coincident with the consolidation of divisions on the Chicago, Rock Island & Pacific, appointments and transfers have been made, effective May 1, as follows: **G. M. Stone,** master mechanic, with headquarters at Manley, Iowa, has been appointed general foreman, with the same headquarters. **B. H. Smith,** master mechanic, with headquarters at Fairbury, Neb., has been appointed general foreman, with the same headquarters. **W. E. Danvers,** master mechanic, with headquarters at Amarillo, Tex., has been appointed road foreman of equipment, with the same headquarters. **A. Hambleton,** master mechanic, with headquarters at El Dorado, Ark., has been appointed general foreman, with headquarters at Shawnee, Okla.

Engineering, Maintenance of Way and Signaling

H. Schantl, who has been appointed chief engineer of the Missouri-Illinois, with headquarters at Bonne Terre, Mo., was born at Festus, Mo., on September 8, 1876. He was educated at Washington University, St. Louis, graduating in 1903. He entered railway service in September, 1906, as an assistant engineer for the Mississippi River & Bonne Terre Railway. In December, 1918, he was promoted to engineer maintenance of way, and was serving in this position at the time of his appointment as chief engineer of the Missouri-Illinois. Mr. Schantl has also been appointed chief engineer of the Mississippi River & Bonne Terre, in addition to his other duties, effective April 1.

Coincident with the consolidation of divisions on the Chicago, Rock Island & Pacific, appointments and transfers have been made, effective May 1, as follows: **A. C. Bradley,** division engineer, with headquarters at Colorado Springs, Colo., has been transferred to the Chicago Terminal division, with headquarters at Chicago, succeeding **C. P. Richardson,** who has been appointed assistant engineer, with headquarters at Fairbury, Neb. **G. Davis,** division engineer, with headquarters at Cedar Rapids, Iowa, has been transferred to Manly, Iowa, succeeding **H. T. Livingston,** who has been appointed master carpenter and division engineer on the Des Moines Valley division, with headquarters at Cedar Rapids, Iowa. Mr. Livingston succeeds **W. E. Heimerdinger,** who has been appointed office engineer, with the same headquarters. **B. A. Wait,** assistant engineer, with headquarters at Fairbury, Neb., has been appointed instrumentman, with the same headquarters. **J. G. Bloom,** division superintendent, with headquarters at El Dorado, Ark., has been appointed division engineer, with headquarters at Colorado Springs, Colo., succeeding A. C. Bradley. **R. Leas,** assistant engineer, with headquarters at El Reno, Okla., has been appointed instrumentman, with the same headquarters. **F. F. Tate,** assistant engineer, with headquarters at Amarillo, Tex., has been appointed instrumentman, with the same headquarters. **W. E. Brown,** division engineer, with headquarters at El Dorado, Ark., has been appointed roadmaster on the Nebraska division.

Purchasing and Stores

W. H. King, Jr., has been appointed general purchasing agent of the Seaboard Air Line, with headquarters at Norfolk, Va., succeeding H. C. Pearce, resigned to accept service with another company, effective April 11.

Special

H. B. Hull, general claim agent of the Illinois Central, with headquarters at Chicago, has been appointed editor of the Illinois Central Magazine in addition to his other duties.

Obituary

F. V. McDonnell, master mechanic of the Pennsylvania with headquarters at Ft. Wayne, Ind., died on April 26.

W. E. Phillips, formerly president of the Chicago & Western Indiana, died of heart disease at his home in Chicago on April 27.

J. W. Mulligan, real estate and tax agent of the Chicago, Rock Island & Pacific, died at his home in Chicago, on Saturday, April 23.

Z. V. Taylor, president of the Piedmont & Northern and vice-president of the Durham & Southern, died suddenly on April 18 on a train en route from Charlotte, N. C., to New York. Mr. Taylor was active in the promotion and organization of the Piedmont & Northern in 1912. He was also the founder and president of the Southern Public Utilities Company, which operates street railways and other public utilities at Charlotte, N. C., Winston-Salem, S. C., Greenville, N. C., and Anderson, S. C.

M. T. Pyne, who was general counsel of the Delaware, Lackawanna & Western from 1880 to 1892 and who served for a time as president of the Warren Railroad and the Cayuga & Susquehanna (companies subsidiary to the Lackawanna), died at New York on April 22. Mr. Pyne was born in New York on December 21, 1855. He graduated from Princeton University in 1877 and from Columbia University School of law in 1879. From the time of his retirement from the practice of his profession in 1892 until his death Mr. Pyne directed the affairs of several large estates and was a director in a number of industrial and financial concerns. Mr. Pyne had been identified with Princeton University as a trustee for the past 36 years.